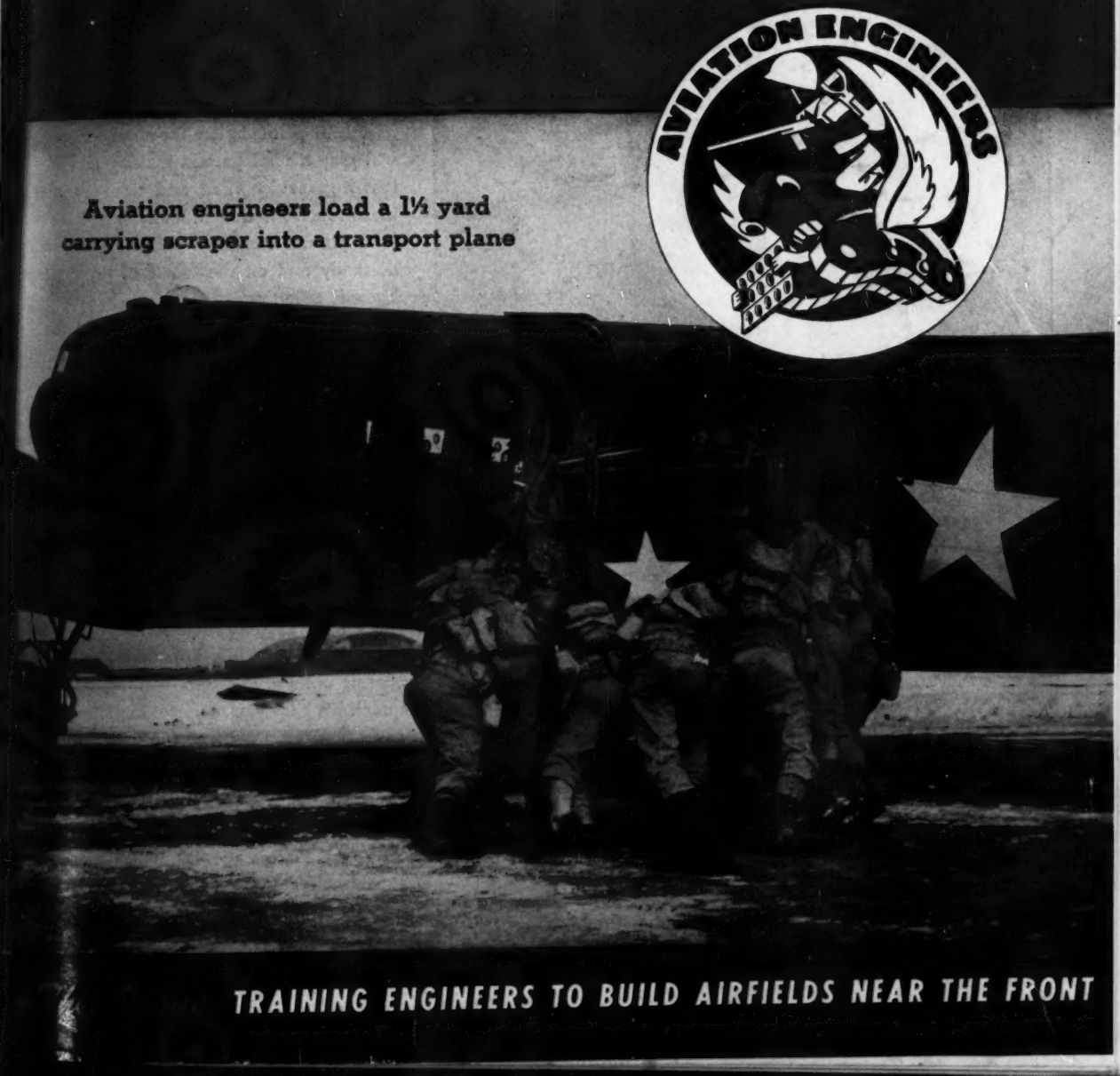
ENGINEERING NEWS-RECORD

JULY 27, 1944



Aviation engineers load a 1½ yard carrying scraper into a transport plane

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WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

...133 JULY 27, 1944 No. 4

...OMING NEXT

...American roadbuilding methods ...re used by the Seabees in push-... a highway through mountainous ...ritory in Trinidad. Over one mil-...s yards of rock had to be cut from ...ep hillsides along the 7½-mile ...te.

...Present-day methods of specifying ...ncrete are to blame for the in-...ior quality of concrete on many ...s, according to R. F. Moss, presi-...t of the Scientific Concrete Serv-... Corp. Mr. Moss holds that spe-...cations should be so worded as to ...mulate producers to provide con-...te best suited to the conditions to ...met.

...Progress on flood-walls and pump-...g stations to protect Memphis from ...h water in the Mississippi is to be ...orted in the Aug. 10 issue. Un-...al foundations were sunk for ...e pumping plants.

...Another of N. A. Bowers reports ... Seabee activities in the Pacific ...ll tell how heavy equipment and ...ght is brought ashore where land-...g facilities are not available.

...Wind tunnels present unusual ...oblems for the structural engineers ... well as for aeronautical experts. ...the Aug. 10 issue there will be an ...count of how concrete was used ...reduce vibration in a high-velocity ...nnel.

...Unusual materials were used on a ...val training station at New York ...e to the scarcity of lumber. How ...igns were developed to meet the ...cial condition is told in the Aug. ... issue.

...HINGS TO COME

... Steel mats were used extensively ...r surfacing runways on Pacific ...nds in the early stages of the ...r. Now, according to N. A. Bow-..., their use is decreasing as ...thods are being developed to sur-...e runways with local materials.

...A thought provoking statement ... public works as a means of re-...cing unemployment has been pre-...ared for *ENR* by M. W. Torkelson, ...rector of the Wisconsin State Plan-...g Board. It is to be published in ...e Aug. 24 issue.

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Number of copies of this issue printed: 35,964

DO YOU WANT AN INDEX?

Due to the paper shortage, no index for the volume just completed, No. 132 (January-June, 1944) will be issued except to subscribers who ask for it. If you want a copy of the index please send in the coupon below.

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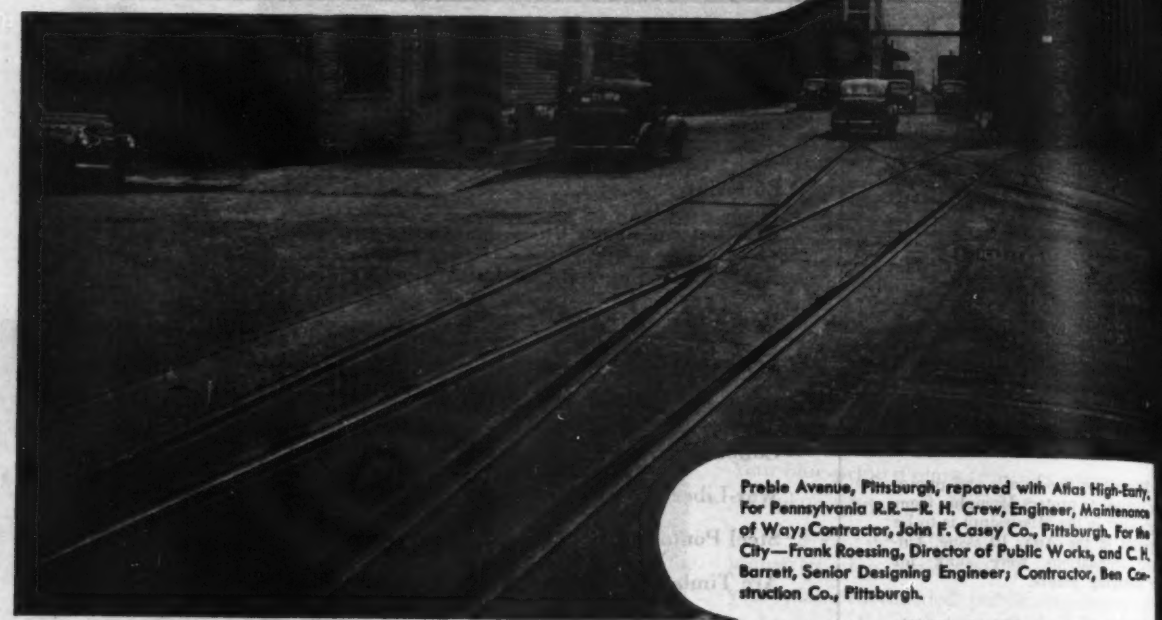
HOW TIME WAS LICKED ON PREBLE AVENUE



Preble Avenue, Pittsburgh, repaved with Atlas High-Early. For Pennsylvania R.R.—R. H. Crew, Engineer, Maintenance of Way; Contractor, John F. Casey Co., Pittsburgh. For the City—Frank Roessing, Director of Public Works, and C. H. Barrett, Senior Designing Engineer; Contractor, Ben Construction Co., Pittsburgh.

Pittsburgh paving job in use 5 days earlier, thanks to Atlas High-Early

THE fall of 1943. This busy street, serving eleven important industries by rail and truck, had to be repaved. The job was *rush*, for time lost meant lost deliveries.

That's why Atlas High-Early was used. *Forty-eight hours* after each of the nine different sections of concrete was placed, it was opened to traffic. Five days earlier than if normal cement had been used! Five days saved on wartime shipments and deliveries!

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1. ***Permits earlier use*** of concrete, and thus gives owner earlier occupancy.
2. ***Saves manpower*** when such conservation is needed most—releases men for new jobs more quickly.
3. ***Conserves lumber.*** Forms may be stripped sooner—sometimes in 24 hours instead of from 3 to 5 days—and re-used. Hence fewer sets of forms may be needed, saving time, labor and lumber.
4. ***Reduces overhead*** by saving time, manpower and equipment.

ENR-H-44

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Atlas High-Early Cement

A UNIVERSAL ATLAS PRODUCT

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • JULY 27, 1944 • VOLUME 133 • NUMBER 4

Salary scale for engineers approved by Civil Engineers

Board of direction of the American Society of Civil Engineers authorizes publication of a classification and compensation plan for engineering employees

Minimum educational and experience requirements for nine grades of civil engineering work, together with recommended ranges in compensation for each grade, were approved by the board of direction of the American Society of Civil Engineers at a meeting held in Cleveland, Ohio, July 17-18. This classification and compensation plan is to be published in the August issue of *Civil Engineering*.

This is the second classification and compensation plan to be approved by the board as the result of exhaustive studies begun several years ago. Covered in the new plan are all levels of employment in the civil engineering field from Grade I, the young engineering graduate, for whom an annual salary range from $1,980 to $2,460 is recommended, to Grade IX, the administrative head of a large engineering organization, for whom a minimum salary of $9,600 is recommended.

Richmond returns

George T. Seabury, secretary of the society, announced at the board meeting that Allen P. Richmond, assistant to the secretary, had been released from military service and had rejoined the staff. Before the war, Mr. Richmond conducted the reclassifications of engineering positions and salaries in some of the state highway departments that were undertaken by the society at the request of the heads of those departments. One of his first jobs on his return to the staff is to assist in a similar reclassification study of the engineering employees of the city of Milwaukee. Such a study was authorized by the board, a special committee being appointed for that purpose.

It was reported at the board meeting that up to the middle of July, 30 of the society's 64 local sections have amended their constitutions to permit the establishment of collective bargaining units under the auspices of groups of professional engineering employees organized by the sections, where that seems necessary to protect the rights of such engineering employees. In five sections such an amendment was voted down, and in five others the directors decided not to submit the matter to vote. Numerically half the members of the society now have had an opportunity to vote on the subject through their local sections. Of those who voted, 2,747 were for the proposal and 480 against it.

Referendum declined

Placed before the board was a petition signed by nearly 1,100 members asking that the society's activities with respect to collective bargaining be made the subject of referendum of the corporate members of the society. This is the third time that this request has come before the board, and for the third time it turned the proposal down. Many factors are said to have affected this decision, the chief ones being the fact that half the membership already has had an opportunity to vote on this subject, with the results given above; also that junior members would have no vote in a referendum by the corporate members whereas they do have a vote in the local sections.

(*Continued on next page*)

U. S. Navy photo

The two bulldozer heroes of Treasury Island

Shown above are Lt. Charles E. Turnbull, CEC, USNR, and Aurellio Tassone, MM 1c., Navy Seabee, standing by the blade of the bulldozer that had been used to uproot a Jap pill box, burying 12 Japs, and destroying a 90-mm. gun and two machine guns. The incident occurred last fall in the landing on Treasury Island in the Solomons, and the daring exploit was described in ENR, July 13, p. 19.

G. Donald Kennedy, chairman of the society's committee on postwar construction, reported to the board that the committee had set as its objective having plans for $15 billion of work ready for action when construction can be resumed on a normal basis. Thirty-eight of the society's local sections have set up regional postwar committees to assist the main committee.

Three cities studied

The committee's research and development division is now engaged in a study of postwar planning in three cities where such planning is well advanced as a guide to other cities in their planning, one large, one medium size and one small city having been selected. The cities are Cleveland, Ohio; Allentown, Pa.; and Fredericksburg, Va.

Mr. Kennedy commented favorably on the survey of postwar public works planning that has been undertaken by the Federal Works Agency (*ENR* July 20, vol. p. 69), stating that it will be a great help to the committee, both in the preparation of its statistics as well as in stimulating interest in advancing projects to the planning stage.

Future meetings

The convention scheduled to be held in Cleveland July 19-21 was cancelled about two weeks before the board meeting because of the critical transportation situation. Due to the continued uncertainty as to transportation, no fall meeting of the society is to be held. The board will hold its next quarterly meeting in Denver, Oct. 9-10. It is expected that the annual meeting of the society will be held as usual in New York in January.

On Monday evening July 17, the officers of the Cleveland section held a reception for the officers of society in attendance at the board meeting.

• • •

Idlewild Airport work authorized by N. Y. City

The Board of Estimate of New York City on July 20 authorized the expenditure of $9,040,000 for the grading and construction of six runways at the new municipal airport at Idlewild, in Queens.

The money, which will be used during the balance of this year, was made available at the request of John McKenzie, Commissioner of Marine and Aviation, and was $8,040,000 more than he originally requested from the board.

This authorization rounds out an estimated $10,000,000 construction program at the airport as included in the 1944 capital budget. The board had authorized expenditure of $300,000 earlier.

New England highway authorities consider postwar traffic problems

Heavy urban construction needed to meet expanding traffic demands — Express roadways serving cities found increasingly important, but by-pass roads are questioned.

When the war ends, the present 40 percent drop in the use of highways by motor vehicles and 65 percent falling off in state highway traffic will soon give way to an expansion of usage that demands vigorous and far-sighted action on the part of public authorities to meet the new conditions in urban and outlying areas. A discussion of this theme featured the second New England Traffic Engineering Conference, held at the Massachusetts Institute of Technology, Cambridge, July 13-14, under the auspices of the M.I.T. civil engineering department and the traffic engineering section of the Massachusetts Department of Public Works. About 200 attended, four sessions being held under the chairmanships of E. F. Copell, traffic engineer Massachusetts Department of Public Works; Prof. A. J. Bone of M.I.T., and H. F. Hammond, director traffic and transportation division, National Conservation Bureau. Brief welcoming addresses were given by Prof. C. B. Breed and Prof. J. C. Wilbur, acting head of the M.I.T. civil and sanitary engineering department.

Much replacement necessary

T. M. Matson, director Bureau for Street Traffic Research, Yale University, stated that roadway capacities may have to be doubled within the next 20 years in this country. Prewar highway travel in the United States totaled over 3.5 billion vehicle-miles. If road life can be assumed to be 20 years, we must replace within that time not only half the world's hard surface roads, but also must create the additional roadway mileage and capacity which will be needed to accommodate the expected traffic increase.

Origin and destination studies, said Mr. Matson, indicate the possibility of overdoing the bypassing of cities, since average trips of 20 miles or less are common. One-way regulation of traffic is now believed to be an outstanding need in many urban areas.

Commissioner H. A. MacDonald, Massachusetts Department of Public Works, predicted more severe restrictions in speed control after the war, heavier maintenance demands, and comprehensive efforts to care for extreme traffic congestion in urban centers now threatened by strangulation. In Boston alone about $35 million should be expended to eliminate a very serious congestion. Federal fund collections from motor vehicle owners should meet these major obligations.

Clarify objectives

A strong plea for establishing aims furthering sound objectives in post-war highway development was made by Commissioner W. J. Cox of Connecticut, particularly as regards the national picture. Recent researches and present techniques insure means of measuring proposed projects against necessities and avoiding dissipation of funds. Mr. Cox emphasized the value of the Connecticut procedure of submitting road problems and projects to a specially created commission, which reports them to the legislature, thus facilitating understanding of such needs and the provision of appropriations.

An extended criticism of federal legislative proposals sponsored by the American Association of State Highway Officials in relation to appropriations for postwar road construction appropriations featured Mr. Cox's address, the speaker contending that these lacked soundness as between the real needs of different states.

Prof. A. J. Bone reviewed wartime restrictions in relation to motor vehicle use, showing that these have worked to the advantage of the car owner in accident reduction, fuel and tire saving. Massachusetts highway accidents fell from 5,968 in 1940 to 2,233 in 1943 and fatalities from 241 to 120.

Future highway projects, the speaker urged, should be treated as individual cases for research. Urban traffic congestion will provide a major problem. Liberal planning should be done, since plans are cheap compared with construction. Highway user revenues may be expected to supply the largest and most dependable source of money for long-range programs in New England, and if these programs are scientifically managed, success should follow.

Suburban highway planning

Walter Devine, town engineer, Brookline, Mass., presented a comprehensive analysis of suburban highway planning to improve traffic conditions, stressing the value of a master plan for a coordinated program. Such a plan, he said, should be flexible enough for continuous

New England traffic engineering conference delegates at M.I.T., July 13-14

e and adjustment to changing needs d advanced technology.

In discussion of details, Mr. Devine id that the use of pedestrian fence rriers along median strips in certain cations has accelerated traffic flow d reduced accidents. Stabilization of vement conditions by reinforced conete slabs above all sub-pavement enching was strongly favored.

Traffic engineering problems in Deoit were discussed by Lloyd Reid in rticular relation to analyses of hicular flow, parking, industrial plant d business area conditions. A traffic op of 15 to 20 percent has resulted om war restrictions, but after the war is expected that this drop wil be reored and that there will be an addiional load of 25 percent about the preous 1941 peak. Wartime population is 000,000, a gain of 500,000 over prewar. khaustive plans have been prepared r a proposed expressway system inuding a downtown collecting and disibuting loop, allied with multiple-deck rking structures within a 550-ft. dius of downtown points. Integration of public and public transportation facilities is also planned. Seventy percent of the traffic now is being handled by automobile.

The Detroit Transportation Board was appointed recently to solve over-all problems of vehicular transportation, with the aid of consultants, city departments, and other agencies.

Better transit facilities needed

Charles Gordon, managing director American Transit Association, New York, presented a paper emphasizing the importance of local public transit facilities in urban traffic development, and coordination of public and private transportation means in city planning. Improved standards of service were advocated on transit systems even if subsidized, in view of their superior traffic capacity.

The principle design factors in the establishment of limited-access arterial systems, as in the Greater York area, were described by S. M. Shapiro, deputy chief engineer, Long Island State Park Commission. Joseph Barnett, chief urban road division, department of design, Public Roads Administration, Washington, D. C., gave an illustrated talk on design details as related to highway efficiency and accidents. C. J. Hooper, supervisor of economic studies, Connecticut Highway Department, also read a paper on highway planning studies in that state, emphasizing the growing obsolescence of many main roads, prospective construction needs to meet an estimated 50 percent traffic increase in 1955 over 1939, methods of analysis, multiple-lane development, and financial requirements. Charles Upham, engineer-director, American Roadbuilders Association, stressed the need of closer cooperation between traffic and highway engineers in postwar programs.

The convention closed with a panel discussion of traffic problems, participated in by Ralph Sawyer of the Maine Highway Commission, F. A. Gardner, New Hampshire Highway Department, Howard Sharpe, Connecticut Highway Department, and J. C. Cressy, Massachusetts Dept. of Public Works.

Arkansas court approves rejection of low bid

The Arkansas Supreme Court on July 0, reversing the Pulaski Chancery ourt, upheld the Arkansas State Hosital Board of Control in its award of $163,000 contract for repairs at the enton unit to G. W. May and Co., Little ock contractors, whose bid was $822 igher than that of Peterson & McFadyen, another Little Rock contracting rm. It was held that the board acted n good faith in rejecting the lower bid n the ground that the original conruction of the Benton unit buildings as defective and that William Peterson, a member of the firm, had built hem.

The case had been advanced on motion of the Board of Control, and the Supreme Court ordered an immediate mandate to Chancery Court. Mr. May said repair work, contracted for last October, would begin immediately.

The court's unanimous opinion said: "The board acted in good faith when it concluded that for a difference of slightly more than $800 it should reject the Peterson & McFadyen bid and assign the work to another, as to whom there was no imputation of carelessness, indifference or studied avoidance as to quality of workmanship."

The original 13 buildings at the Benton unit were started in 1931 and completed a year later but were not put into general use until the winter of 1936-37 because lack of funds prevented installation of the necessary central heating plant.

Large cement plant to be built at Memphis

The Missouri Portland Cement Co. of St. Louis, Mo., has completed plans for the construction of a portland cement plant in Memphis, Tenn., to be built as soon as War Production Board regulations permit. The plant, which will be served by both the Missouri-Pacific and Illinois Central railroads will cost $7,500,000 and will have an annual capacity of 750,000 bbl., will make a standard portland, a high-early strength, a masonry, and a concrete-products cement.

Provided the War Production Board releases the equipment and materials, the plant is expected to be in operation in time to serve the postwar market.

ENGINEERING ABROAD AS SEEN BY ENR EDITORS

Notes on Concrete in Brazil

Arthur J. Boase
Special Editorial Representative, Engineering News-Record

As announced in the July 13 issue, Mr. Boase is on leave from his position as manager of the Structural Bureau of the Portland Cement Association to survey reinforced concrete practice in South America for *ENR* readers. This letter is evidence that he is making progress.

SAO PAULO, July 5—Two or three more days here, and I shall have finished with Brazil for this trip—with real regret that I cannot stay longer, for everyone has been most friendly and helpful.

During a month in Rio and Sao Paulo, I have witnessed many, to me, strange sights. For example, I watched the placing of concrete in beams as narrow as 2 in., and have seen 18x24-in concrete columns being erected in which there were as many as twenty ⅜-in. rods. Hollow construction is also quite common.

Men work hard and well for as little as 6 cents per hour. The charging of cement mixers by two men carrying a wooden box puzzled me, but I am told this is the most economical way, although wheelbarrows would seem to be cheaper and better. I observed a large railroad cut being built by swarms of men with pick and shovel digging down the bank and loading onto horse-drawn wooden dump carts. Not a piece of power equipment on the job, and all this where there is a labor shortage.

Another interesting sight has been a new steel plant in which the buildings are almost exclusively of concrete. The rolling mill building is 1,280 meters long. The first central batching plant ever erected in Brazil is being used on this job, and all of the concrete is mixed in American-made transit mixers. Even more spectacular than the steel plant is a gambling casino dome of concrete 50 meters in diameter, and an office building that will be 174 meters high from footings to top, and will have 43 stories, the highest concrete building in the world.

One of my interesting experiences was to attend the second symposium of what is destined to be the A.S.T.M. of Brazil. Subjects covered all had to do with concrete. One paper on Prof. Cross's moment distribution was particularly well done.

In Brazil, much praise is given to German and French methods of stress analysis, and the literature of these countries is much in demand. American books are severely criticized as too elementary. Also the reinforcing steel from the United States is claimed to be short on extensibility, generally failing to pass the "national bend test." There is much discussion of the present fast pace of building construction, with all engineers and constructors in agreement that the present rate can be maintained, but business men are not so sure. Manufacturers claim they do not have to sell, that their problem is to fill orders.

Taking pictures of important engineering operations isn't as easy as it sounds. Holding them is even more difficult. I lost some I'd give my right eye to have. Customs officials have them, and I'll probably return with the eye, but without the pictures.

Now on to Buenos Aires. If Argentina and Uruguay are as exciting as Brazil, this is the perfect trip.

• • •

Successful bond sale for Dallas improvements

One June 28, Dallas, Tex., received a bid of $1,490,535 for $1,500,000 worth of improvement bonds. This is the best bid for bonds Dallas has ever received. The interest rate on the winning low bid is 1.05 percent. However, the discount of $9,465 makes the real interest rate 1.11 percent. The best interest rate on bonds Dallas has ever received heretofore was 1.13 percent.

The winning price on $1,500,000 worth of bonds was submitted by a syndicate made up of Louis B. Henry of Dallas, the First National Bank of Chicago, and the Northern Trust Company of Chicago. Bonds will mature every year for a period of 20 years.

Committee set up to fix water policies

A new committee called the Departmental Water Resources Committee has been formed within the Department of the Interior to coordinate efforts of the various agencies and bureaus of that department, and to maintain liaison with other federal agencies engaged in development of water resources.

Secretary Harold L. Ickes has announced appointment of Lee Muck, assistant to the secretary in charge of land utilization, as chairman and William G. Hoyt, hydraulic engineer with the Geological Survey, as vice-chairman and executive officer.

Other members will be: Glenn L. Parker, chief hydraulic engineer, Geological Survey; William E. Warne, assistant commissioner, Bureau of Reclamation; Joseph C. McCaskill, assistant to the commissioner, Office of Indian Affairs; Arthur E. Demaray, associate director, National Park Service; Ira N. Babrielson, director, Fish and Wildlife Service; and Stephen Raushenbush, division of power.

Sound water policy desired

In commenting on purposes of the new committee, Mr. Muck said: "We hope to be able to arrive at a sound water policy for the Interior Department which will assign fair and proper priorities to all interests in the use of water."

He said, also, that coordination before, rather than after construction has started, is a committee objective. Toward this end, all projects proposed by any bureau of the department will be passed on by the committee, in the light of other departmental interests. Plans approved by the committee will be reviewed by the existing Inter-Agency River Basin Committee which is made up of representatives of the Corps of Engineers, Federal Power Commission, Department of Agriculture, and the Bureau of Reclamation. This is expected to eliminate much of the current confusion resulting from overlapping jurisdictions.

Mr. Hoyt's experience

Mr. Hoyt, the new committee's executive officer, resigned his position with the Geological Survey to take up his new duties. During 30 years' experience there, he had been engaged on river surveys and other hydraulic investigations in New York, New England, and in the upper Ohio River basin and the upper Mississippi River, and since 1933 on special hydrologic problems directed toward water utilization.

onstruction Communiques

Engineering news from the battlefronts

Negros Island—The War De- ment has announced the award of honors in the name of the ident to the Fortieth Construction alion of the Navy for outstanding rmance of duty on Los Negros d, Admiralty group.

tracts from the citation are as ws:

The Fortieth Construction Battalion, ed States Navy, is cited for out- ding performance of duty in action nst the enemy on Los Negros Is- , on March 2, 1944. This unit ed during a critical situation when holding of the harbor and air- against overwhelming enemy es was precarious.

Notwithstanding the fact that the was still under enemy fire, the alion immediately on landing as- ed its assigned work in clearing repairing the airstrip. During progress of their work it became mon-place for the operators to be upon by snipers, and for the rators to return the fire while con- ing their work.

It soon became evident that cav- patrols operating against the my required fire lanes into the gle to permit concentration of au- atic weapons against the enemy the battalion had no sooner ned of this need than they turned ir bulldozers into the jungle, cut required fire lanes in superb dis- ard of the enemy fire and estab- ed adequate areas for the control the enemy.

After working all day and fighting night, small parties of the con- uction battalion personnel still found e during their few hours of leisure duty to rout out small bands of enemy, locate and report pillboxes otherwise carry the offensive to enemy's positions.

The cheerful and uncomplaining itude of these engineers and their standing esprit was noticeable.

In particular, the operation of the lldozers into the teeth of the my's positions was most inspiring heartening, and created an im- diate resurgence of the offensive rit in weary troops."

Normandy—Writing in the Washing- "Star" Walter McCallum, war rrespondent pays this high tribute the Engineers in the successful bat- for Cherbourg:

"In a jeep driven by Jimmy Lake of San Francisco I went up to the front near Cherbourg, where the enemy held the slopes of a valley a few hundred yards from our forward observation posts.

"Not 200 yards from this exposed spot were the combat engineers, with their bulldozing equipment, filling up shell holes even while pillboxes blazed and smoked a few yards from the spot where they were pushing dirt.

"We came across the beachhead with some special heavy equipment, including bulldozers. Their purpose was to push sand up across the concrete sea wall and thus make a path for the troops to come. You see the same equipment today on the roads of France, traveling on tracks.

"The engineers were fully equipped with carts of tarred gravel, shovels and heavier stuff. Some of them were hurt and one or two killed, but they kept right on shoveling dirt, making the roads passable for frontline action, although they themselves were in the front lines.'

St. Lo—Aiding in the recent capture of St. Lo the important communications center near the base of the Normandy peninsula, our combat Engineers repaired locks on the Vire River and made the water rise at the rate of six inches an hour, flooding a bridge that the enemy had been using. A 6-ft. rise in the river near St. Lo inundated several low bridges and hampered the Germans' communications so that our victory was more easily accomplished.

Invasion Beachhead—James MacDonald in a dispatch to the New York "Times" tells about the engineers' work on the beachhead in Normandy.

"During the first two days of the invasion the Allied engineers constructed six bridges, one or two of them as long as 200 feet. The British laid their first pontoon bridge on 'D-plus-five-day' June 11. About the same time the Americans completed their first river bridge over a stream with a ten-foot tidal rise.

"In many cases the engineers had to do some active fighting themselves before getting on with their own jobs. Sometimes they rushed ahead of their main supports and seized important installations to prevent the Germans from demolishing them."

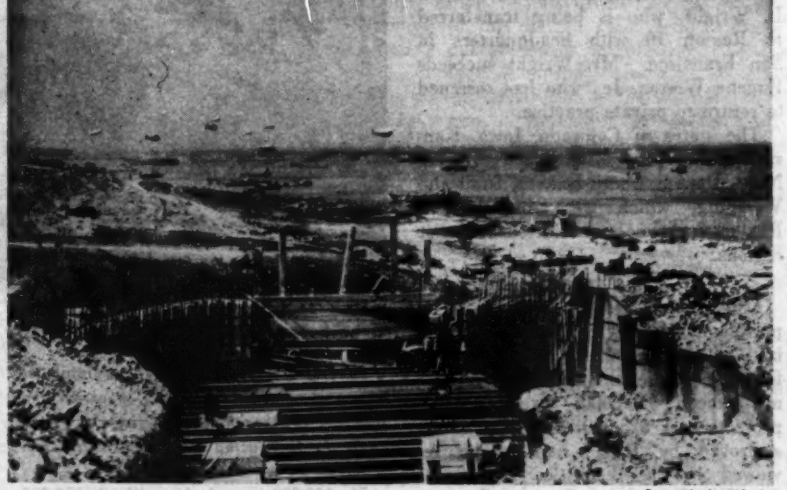
Bougainville—Charles J. Snyder, M. M. 1/c writes to the Baltimore "Sun" as follows:

"I should like to inform you that Seabees were along on the invasion of Bougainville, including my outfit.

"The four-lane all-weather highway you mentioned was built by Seabeas, later extended by the army. All the airfields were constructed from scratch by Seabees. Incidentally, we were commended for our part.

"We, too, had a sawmill there, and the original bridges were Seabee built, reconstructed later by the army. . . .

"The army is doing a great job, but so are all our forces, so please give credit when and where it's due."



Press Ass'n. photo

German engineers were interrupted on this job

Here is a picture of uncompleted fortifications of the German "West Wall" on the Normandy coast of France. In the background is the huge Allied supply fleet which the enemy had hoped to sink before landings could be made.

WASHINGTON HIGHLIGHTS

Effective July 24, 1944, the prices of vitrified clay sewer pipe and allied products produced in Iowa, Minnesota, North and South Dakota, and western Wisconsin were increased by 11.4 percent over existing maximum prices for these products.

The War Production Board has issued a list of 86 questions and answers intended to clarify provisions of its lumber control order L-335 (ENR, June 29, page 919). The interpretation distinguishes, for instance, between lumber for use in structures and lumber for fabricated products.

At the request of the Joint Chiefs of Staff, the United States Maritime Commission has awarded contracts for the construction of 262 additional ships, including the following: 174 Victory ships, 30 ships of C-1 type, 15 vessels of C-2 type, 7 large tankers of T-2 type, and 36 coastal cargo ships. All are to be completed before July 1, 1945.

The National Housing Agency announces the closing of its Region 7 office in Kansas City, Mo. This reduces to seven the number of regional offices having charge of programming both public and private construction under the housing program. Joseph P. Tufts, regional representative at Kansas City, has been transferred to Region 8 at Dallas, Tex., to replace Preston L. Wright, who is being transferred to Region 10 with headquarters in San Francisco. Mr. Wright succeeds Eugene Weston, Jr., who has resigned to return to private practice.

The states of Colorado, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Utah and Wyoming, which were included in Region 7, have been shifted to other regions.

Construction projects undertaken by petroleum industry can now be authorized by the Petroleum Administration for War if the amount involved does not exceed $100,000. Previously all projects over $25,000, after first being approved by PAW, had to be reviewed by the Facilities Bureau of the War Production Board. Since it is estimated that 95 percent of project applications from this industry come within the $100,000 bracket, it is believed the new ruling will facilitate this type of construction.

Big causeway destroyed by storm is repaired

The rebuilt Lavaca Bay causeway connecting Port Lavaca and Palacios, Tex., was opened for traffic on July 6, thus eliminating a 60-mile traffic detour necessary during the rebuilding of the causeway.

Rebuilding was necessary because of damage to the 10,300-ft. concrete and creosoted-wood structure by a storm in August, 1942, which destroyed 329 spans of the causeway. Salvaged material was used for 209 of these rebuilt spans. The entire cost was $550,000, borne by the Texas State Highway Department and the Federal Works Agency.

Moore & Turner of San Antonio were the contractors on the repair job, which required almost a year.

Kentucky pays $588,000 for freeing toll bridges

Payments of $588,000 will be ma July 1 on Kentucky's thirteen t bridges, leaving a balance of $1,93 000, to come from future toll charg

Bonds called for payment July include the last due on the bridge Calhoun, which was opened to fr travel Jan. 29. The span was bou for $250,000 from private owners.

While balances due on the remainin twelve are too great to be paid off th year, it was said by the state highwa department that receipts are runnin well ahead of last year.

Two bridges were paid off and r leased from tolls last year, those Paducah and Cattlettsburg, making total of seven freed since the first bon issues were sold in 1930.

Shasta dam power plant delivering 150,000 kw.

Power from two 75,000 kw. generators at Shasta dam, Calif., officially went on the line July 14, though actual delivery has been made to the Pacific Gas and Electric Co. regularly since late June.

The 150,000 kw. out of an ultimate 375,000 kw. capacity of the power plant are distributed by the P. G. and E. under contract with the government. However, full deliveries of power will not begin until the end of the current year. Complete power installation will be made at the end of the war.

Shasta Dam, second largest masonry structure in the world, is nearing completion with only the top center portion left to be filled out with concrete. Built at a cost of $87,167,200, the dam, power plant and Shasta-Oroville transmission line have been under high priority orders on an emergency construction program to supply electric energy for the increasing expansion of California war industries.

MEN AND JOBS

Maj. W. W. Slaton, formerly superintendent of utilities at the Anniston Ordnance Depot, Anniston, Ala., has retired from the service because of permanent disability incurred in the line of duty. A familiar figure in highway and sales engineering circles in the southeast, Major Slaton will spend his period of convalescence at Marianna, Fla.

E. L. Filby, who has been serving since Sept. 1, 1943, as field director for the Committee on Water and Sewage Works Development in its "Blueprint Now" postwar campaign, has returned to his regular position as principal assistant engineer with Black & Veach, Kansas City, Mo.

Lt. Col. Stephen R. Hammer, U. S. District Engineer at Denver, has announced that **Maj. H. D. Thomas** has been transferred from Pueblo, Colo., to the Denver Ordnance Depot where he will be operations officer of a new manufacturing plant. Major Thomas has taken over the duties of **Capt. Harton D. Burton,** who is now at Owlry Field, near Denver. **Maj. D. A. McKinnon,** who has been away from Denver District has been transferred to duties at the Denver Ordnance plant. **Capt. Raymond T. West,** formerly assistant to Major Thomas at Pueblo, is now operations officer there.

Lieut. Col. T. E. Hinson has been appointed city manager of Chapel Hill, N. C., to succeed the late John L. Caldwell. Hinson was graduated from University of North Carolina with a B.S. degree in engineering in 1921. He is a veteran of World War I, and was recently discharged from the Army after having served again for nearly four years.

William Colby has been appointed town engineer of Wallaceburg, Ont.

John R. W. Ambrose, superintendent, Toronto Terminals Railway Co., has retired on pension after 35 years service at the Union Station, Toronto, and a railroad career of 47 years. As chief engineer, Mr. Ambrose supervised the preparation of final plans for Toronto's Union station and the viaduct approaches for the Canadian Pacific and Canadian National Railways, completed in 1922. He has also prepared plans for other joint railway facilities in Montreal and Ottawa.

C. E. Overbeck, formerly architectural engineer at its Dallas, Tex. office for the Southwestern Bell Telephone Co., has been made general architectural engineer. He will supervise the design and construction of telephone buildings in Texas, Arkansas, Oklahoma, Kansas, and Missouri. **Harold Vaughn** of Kansas City succeeds Overbeck at Dallas and **Dick Perry** of Dallas succeeds Vaughn at Kansas City.

J. W. Smith has been appointed assistant chief engineer of the Seaboard Air Line Railway at Norfolk, Va., and **J. R. Traphoner** has been named assistant to the chief engineer.

John S. Galbraith, civil engineer, of Toronto, has been appointed to the staff of the National Housing Administration of Canada at Ottawa to assist F. W. Nicholls, director, in town planning. In announcing Mr. Galbraith's appointment, Finance Minister Ilsley said that the appointment was made to assist in the development of better public understanding of the principles of community planning and promoting their adoption by Canadian municipalities.

The Turner Construction Co., building contractors of New York City, have announced the election of **George F. Ferris** as vice president.

Mr. Ferris recently returned from Honolulu where he served as chairman of the operating committee of the PNAB Contractors in the construction of naval fleet and air bases at various points in the Pacific. The Turner Construction Co. was a leading partner in this group. These contracts, begun in 1939 at the inception of the defense program and greatly extended thereafter, have just been completed. Mr. Ferris joined the Turner Construction Co. in 1929. Earlier he directed the construction of a number of important contracts for Turner in New York, Washington and elsewhere.

O. W. Crowley, Des Moines, Ia., has been re-employed as executive secretary of the Central Branch of the Associated General Contractors of America. He held the position for 20 years before he went to Alaska in 1942 to work on the Alaska highway project.

C. L. Sampson, Des Moines, chief engineer for the Northwestern Bell Telephone Co. in Iowa, has been named assistant to the vice president at Omaha, Neb. He is succeeded as chief engineer by **L. O. Arstad,** who has been serving as general manager at Minneapolis, Minn.

D. A. Davis, chief engineer of the Northwestern States Portland Cement Co. at Mason City, Ia.; **Eugene O. Olsen,** of the engineering extension service of Iowa State College, Ames, and **John M. Drabelle,** consulting engineer of the Iowa Electric Light and Power Co., Cedar Rapids, Ia., are among co-ordinators named for the national fuel efficiency program in the midwestern area.

Lt. Col. John T. Knight, Jr., district engineer of the Wilmington, N. C., district office, U. S. Engineers, has been transferred to overseas duty, and has announced that the Wilmington office will revert to civil works exclusively and that military construction activity will be transferred to the Savannah, Ga., headquarters of the engineering division. The rivers and harbors section of the district office will continue to operate and is not affected by the transfer of military construction activity. Administration of the Wilmington office now is in charge of **Major Paul E. Werner,** executive officer, serving as acting district engineer.

Grant R. Jack, commissioner of works for East York Township, one of Toronto's suburban municipalities, has been appointed city engineer of St. Louis, Newfoundland. Mr. Jack received his engineering training at the University of Toronto and joined the City of Toronto Works Department shortly thereafter.

Lester W. Millard has announced his resignation as bridge engineer for the Michigan State Highway Department. During the 11 years Mr. Millard has been head of the department's bridge division, he has supervised the construction of 384 structures costing more than $20,000,000.

JOBS OF THE WEEK

STRUCTURES, RAILROAD, etc., Bangor, Wash.

Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded a contract for structures, barricaded sidings, railroads and roads, in Magazine Area to Sound Construction & Engineering Co., and Peter Kiewit Sons Co., Seattle, Wash., at $2,424,347.

STORAGE BUILDINGS, Jacksonville, Fla.

Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded a contract for constructing 3 storage buildings at Naval Air Station to Batson-Cook Co., Inc., West Point, Ga., at $1,116,811.

QUICK FREEZE PLANT, Nashville, Tenn.

Polar Cold Storage, Inc., Nashville, awarded a contract for the construction of 1-story, 220x880-ft. quick freeze plant to V. L. Nicholson Co., Nashville, Tenn. The estimated cost is $1,000,000. B. Warfield & Associates, Nashville, Tenn. are the architects.

HOUSING, Chicago, Ill.

Princeton Park Trust Co., Care of D. O'Toole, Chicago, will construct by separate contracts group 2-story, house, Wentworth Ave., 91st to 95th Sts., to cost $3,000,000. Holsman & Holsman & Klekamp, Chicago, are the architects.

STOREHOUSES, at Naval Supply Depot, Mechanicsburg, Pa.

James Stewart & Co., Inc., New York, N. Y., has been awarded a contract by the Bureau of Yards & Docks, Navy Dept., Washington, D. C., for constructing storehouses, roads, tracks, at Naval Supply Depot at $3,379,600. Gravell & Minick, Mechanicsburg, are the engineers.

BY-PRODUCTS COKE PLANT, Aliquippa, Pa.

Koppers Co., Pittsburgh, Pa., has been awarded a contract for a by-products coke ovens plant by Jones & Laughlin Steel Corp., Pittsburgh, Pa. The estimated cost is $7,500,000.

HOUSING, Chicago, Ill.

Public Housing Administration, Chicago, Ill., received the lowest bid for 250 two-story residences from Welso Construction Co., Chicago, Ill., at $1,294,845. Loebl & Schlossman, Chicago, Ill. are the architects.

RUNWAYS, TAXIWAYS and PARKING APRON, Langley Field, Va.

Bureau of Yards and Docks, Navy Department, Washington, D. C., awarded a contract for reconstructing runways, taxiways and parking apron and all appurtenant work at Langley Field to T. E. Ritter Co., Norfolk, Va. at $1,941,563.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 149.

Funds are released to finish Mirage Flats

The Mirage Flats project on the Niobrara River near Hay Springs in Dawes and Sheridan counties, Nebraska, is to be completed by the Bureau of Reclamation following recent revocation by the War Production Board of its stop-work order. The earth and rock-fill dam, now about 60 percent complete, will be finished to form a 30,000 ac.-ft. reservoir designed to furnish water for irrigating 12,000 acres.

The revised total estimated cost is $3,100,000. This represents an increase of $880,000 over the original $2,220,000 estimate, mainly due to the fact that the original calculation did not include the cost of construction labor. As originally planned in 1940, the Works Project Administration was to furnish $1,385,000 for labor and some materials. Since WPA is no longer functioning, funds had to be obtained from some other governmental source.

Completion of the work is made possible by approval by President Roosevelt of the use of funds provided by the Water Conservation and Utilization Act, amended last year to make money available under such circumstances to provide free labor, or that by prisoners of war, for projects essential to producing war food.

Though the WCU Act provides that projects completed under its provisions be transferred to the Department of Agriculture for administration, transfer in this case is to be postponed indefinitely, under provisions of the President's approval.

More housing planned in congested areas

The National Housing Agency and the War Production Board announce a new construction program of housing for resident war workers (non-immigrant) in congested war production areas. The two agencies estimate that several thousand dwelling units will be built under the new program during the remainder of this year, with a probable quarterly volume of 25,000 units during 1945.

The new program is designated as H-2 housing, and is in addition to work authorized in February (also designated as H-2) to relieve conditions of extreme general hardship in communities. It is also in addition to housing permitted since February to relieve individual cases of hardship.

The new H-2 program is to be limited for the time being to war production areas. In such areas where housing construction for inmigrant workers is still under way, however, quotas for housing for resident workers will not be approved unless there is evidence it will not interfere with scheduled completion of the inmigrant housing.

The arrival of service workers and the families of military personnel, formation of new families, and increasing family size, the joint announcement says, have all contributed to a housing scarcity, and such persons and families are not eligible to live in the inmigrant war-workers dwellings.

Locality quotas will be established on the basis of acute congestion. After these are established, private builders can file application for priorities with field offices of the Federal Housing Administration. It is also announced that some assistance for public housing is available under loan contracts outstanding with local housing authorities for low-rent housing whose construction was suspended with outbreak of war.

Though sales prices of the new housing will be generally limited to $6,000 and rentals to $50 a month, cost ceilings will be raised to $7,500 and $62.50, respectively in areas of high construction cost. In programs providing more than 300 units, at least half are to be reserved for rental.

The housing will be subject to prevailing WPB standards covering overall size, room size, and use of materials and equipment.

In connection with these standards the American Federation of Labor has voiced its disapproval of applying them to the new housing for resident war workers. Harry C. Bates, chairman of the Housing Committee of AFL, objects that workers "will be forced to buy these homes at inflated prices."

OBITUARY

Oberlin M. Carter, 88, sometimes called the American Dreyfus by his friends, died in Chicago July 18, thus ending his 45-year struggle to vindicate himself from the court-martial verdict which cut short his career as an Army engineer. A graduate of West Point with high honors, in 1899 he was convicted on a charge of defrauding the government in letting contracts for numerous river and harbor improvements. He had directed a $3,500,000 engineering project at Savannah, Ga., and had been appointed Army engineer of the Nicaragua Canal Commission. He served a sentence of five years in Leavenworth. He claimed that he had incurred the enmity of a powerful politician by refusing to recommend Nicaragua instead of Panama as the location of the Isthmian canal. His case went before the U. S. Supreme Court four times. In 1939 the House Military Affairs Committee voted to invalidate the conviction and to vindicate him, and he had hoped in vain to receive the same action in the Senate.

William Carr Musick, 76, vice-president of the James H. Bright Contracting Co., died July 13 in St. Louis, Mo. He was with the construction company for more than sixty years and supervised the construction of many prominent St. Louis buildings, including the Missouri Athletic Club, the Mississippi Valley Trust Building and the Administration Building at Washington University.

Charles Bingham Penrose, 72, a civil engineer, at one time associated with the municipal government of Baltimore, Md., died there July 11.

Jules Harnel, 58, prominent civil engineer, died at Quebec July 13.

Howard DeVoe, 70, a construction engineer, who recently had been with the Municipal Housing Administration, died July 12 in Louisville, Ky. For 44 years he was an engineer with the Louisville Railway Co., latterly as superintendent of construction. He then went with the Municipal Housing Organization as construction engineer for five years.

Joseph James Battershill, 66, South Boston, Va., road contractor, died in Durham, N. C., July 15. He was a former member of the South Boston town council and a former director of the Associated Contractors of Virginia.

Alfred E. Buelow, 54, consulting engineer, died July 14, in Cleveland, Ohio.

Charles G. Thomas, 50, formerly of Little Rock, Ark., and latterly of Texas City, Tex., employed by the United States Engineers, died recently.

Charles R. Stanhope, 68, Ashtabula, Ohio, city engineer the last 24 years, died July 13. Mr. Stanhope had been connected with the city engineering department for 50 years.

Peter G. Rimmer, 74, of Nanticoke, Pa., an engineer and highway authority, died July 15. During the first World War he was recruiting officer for the Quartermaster's Department in the East, with headquarters on Governors Island, N. Y.

Alfred Hedley Morgan, 71, of London, Ont., died July 5. For 40 years he had been with the engineering firm of E. Leonard & Son, latterly as vice president.

. . .

Engineers decorated for meritorious service

Among Army awards made during the past few weeks were Legion of Merit medals to four well known Army Engineer officers, Brig. Gen. James H. Stratton, Col. John L. Person, Col. David H. Tulley and Lt. Col. Clayton E. Mullins.

Gen. Stratton, at present assistant chief of supply, Headquarters Staff, European Theater of Operations, received his award for services from December, 1941, to November 26, 1943, as chief of the engineering division, Office, Chief of Engineers, Washington, where "he displayed unusual foresight in the adaptation of the design of military construction in the United States to the conditions imposed by reduced availability of material, labor and construction equipment."

Col. Person received his award for service in the construction division, Office, Chief of Engineers, where as assistant to the chief of the Air Forces Projects Section from April 7, 1941 to March 28, 1943, his work was a "contributing factor to the timely completion of the facilities" required in the Air Force expansion program.

Col. Tulley was given the Legion of Merit for services as chief of the control branch, Office, Chief of Engineers, from May 4, 1942 to Oct. 26, 1943, "which he established and organized," resulting in "more efficient operation of branches and divisions of the Corps of Engineers."

Lt. Col. Mullins' award resulted from services with the Engineer Board at Fort Belvoir, from March, 1941 to February, 1944. Col. Mullins was first in charge of the development of bridge equipment, then chief of the bridge branch and desert warfare branch, and finally director of one of the technical divisions of the Engineer Board. His citation reads, "His untiring efforts, superior technical ability and foresight contributed substantially to the successful and expeditious development and improvement of many important items of Engineer equipment, including the steel treadway bridge, pneumatic floats and boats, tramways, cableways and other mountain warfare equipment, rafting equipage, portable landing mats and portable petroleum distribution."

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New Brunswick orders survey for tidal power

The possibility of developing the tidal waters of the Petitcodiac River in New Brunswick will be surveyed immediately on behalf of the Department of Transport. The Toronto engineering firm of H. C. Acres has been given the task of making the survey.

Petitcodiac River flows into the upper end of the Bay of Fundy, which is noted for its high tidal range.

WEEKLY CONSTRUCTION SUMMARY

CONTRACTS

Continental U. S. Only
(Thousands of Dollars)

	Week Ending 1943 July 29	1944 July 20	1944 July 27
Federal	$31,918	$16,100	$20,822
State & Municipal	3,034	8,037	5,191
Total public	$34,947	$24,137	$25,513
Total private	6,207	11,926	15,553
TOTAL	$41,154	$36,063	$41,066
Cumulative 1944 (30 weeks)			$1,050,391
1943 (30 weeks)			$2,002,540

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1943 30 Weeks	1944 30 Weeks
NON-FEDERAL	$267,350	$290,491
Corp. Securities	15,321	85,845
State & Mun.	91,896	65,186
RFC Loans	9,000	56,460
FPHA Loans	3,133	....
REA Loans	20,000	20,000
Fed.-Aid Hwy.	128,000	63,000
FEDERAL	$2,653,838	$1,263,800
TOTAL CAPITAL	$2,921,188	$1,554,291

ENR INDEX NUMBERS

Index base=100		1913	1926
Construction Cost	July '44	299.94	144.18
Building Cost	July '44	235.55	127.33
Volume	June'44	91.	40.

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

The Bridge at Minturno

Sir—The war photographs appearing on both the cover and page 8 of your issue of July 6 interest me personally, in that I am a native of the town of Minturno, Italy.

It has been nothing short of a heart break to see the ruin wrought by the war not only on the modern steel and concrete bridge over the Garigliano River, but also on the old suspension bridge which stood alongside of it as an ancient relic. The latter was a real work of art with Egyptian architectural lines, and was built in 1828 by Ferdinand II of Bourbon, king of Naples. Both bridges were blown up by the British last January "to prevent the Germans from crossing back to the south side of the Garigliano River."

Strange to say, in the town of Minturno, which is barely discernible in the background at right of the photograph on page 8, the Cardone family is very numerous, and I wonder if Major Cardone appearing on the cover page is any blood relation to it.

JOSEPH F. RAUS,
Brooklyn, N. Y.

Checks in Timber Connections

Sir: In the Comment and Discussion columns of Engineering News-Record for June 15, Albyn Macintosh refers to the article "Round Table Discussion of Moisture Content in Timber" (*ENR*, Jan. 13, 1944, vol. page 39).

Presently published working loads for timber connectors, based on tests and experience of the Forest Products Laboratory, United States Forest Service, make allowance for the various stresses in a normal timber connectored joint in which faces of adjacent members are in contact. If adjacent faces are kept in contact by tightening of nuts on bolts when unseasoned lumber has been used, the effect of normal seasoning checks or end splits may be disregarded, internal stresses crossing the unchecked portions.

There are thousands of such joints in trusses in use with no evidence of distress or deformation. Examination of many structures has disclosed that those built prior to the war are in excellent condition, and it is only in those in which the rush of war work has required the use of unseasoned lumber and the joints have not been kept tight, or in some cases of hasty or faulty design, that any question has arisen.

C. J. HOGUE,
In Charge Technical Service, West Coast Lumbermen's Association, Seattle, Washington

What is the Correct Formula?

Sir: The article "A Formula for Concise Specifications" by Robert L. Franklin in *Engineering News-Record* April 20, 1944, p. 552, lays down several very good principles in the writing of specifications. Unfortunately, however, the "formula" does not make a clearcut distinction between the contract and the specifications. In the opinion of the writer, this is a weakness.

The following basic distinction between the contract and the specifications appears desirable:

(1) Place in the specifications only the technical, that is, the engineering requirements, which concern the method and manner of performing the work and the magnitude and quality of materials and work to be performed.

(2) Place in the contract (agreement) all clauses of a strictly contractual, procurement, and legal nature.

Mr. Franklin divides the contract documents into four main parts, but lumps the specifications and contract together in a manner that leads to confusion and makes it hard to see what is the contract and what are the specifications. He divides what he calls "contract and specifications" into six sections, which are partly specifications and partly the contract. Thus, Section I, Initial Covenants, and Section II, Definition of Terms, are contract clauses. Section III, General Provisions, contain mostly specification requirements, except that some of them, such as "Powers of the Engineer" and "Ownership of Drawings" most properly belong in the contract. Section IV, General Conditions of the Contract, belong in the Contract. Section V, Special Provisions, obviously contain specification clauses, except that such clauses as "time of completion," "protection against damages," and "safety requirements" are contract clauses, while "condition at site" and "preference rating" may better be placed in "Instructions to Bidders."

The writer is pleading for a more clearcut and concise subdivision between the contract and the specifications, because he feels that this will avoid confusion and be more in conformity with the respective uses and purposes of the contract and the specifications. Particularly, is it believed, that a set of specifications that contain only the engineering, technical requirements, will be much more useful on the job for the engineers, inspectors, and contractors, who are only concerned out on the work with scope, materials, workmanship, and construction. In accordance with such a "formula" the writer would take Mr. Franklin's "contract and specifications" and make two distinct and separate documents as follows:

1. Contract, containing initial covenants, definitions of terms, and general conditions of the contract, much in the same way as the agreement form set up by the American Institute of Architects. This is a good form to follow.

2. Specifications, divided into "general requirements" and "detailed requirements." Under the general requirements the following should be covered: Scope, contract drawings, General description, shop drawings, general paragraphs on materials, equipment, workmanship, inspection, samples, tests, lines and grades, access to site, contractor's office, etc. The "detailed requirements" should preferably be separated into a separate section for each item or for each trade, describing under each all work required as to scope, work by others, construction, materials, workmanship, and tests.

Under such a set-up, it is believed that a more correct "formula for concise specifications" will have been obtained.

ROLF T. RETZ,
404 Shenandoah Road, Hampton, Va.

A.S.A. Building Code Work

Sir: Your editorial, "Building Code Guidance" (*ENR*, May 4, 1944, vol. 683): "Engineers and city officials who are seeking suggestions for improving municipal building codes can find both guidance and inspiration on the West Coast where 225 cities and other governmental units operate under the same modern ordinance."

The Pacific Coast Building Officials Conference, which developed the "Uniform Code," has undoubtedly made an outstanding contribution in the field of uniform building regulations and many members of the conference have given generously and freely of their time to this work. However, as you undoubtedly know, the American Standards Association has also, for many years, been active in the development of safety and building codes.

The provisions of both the Uniform Code and the ASA Standard Code Requirements are first proposed and approved by committees; after which they are adopted by the conference and standards council, respectively. As a rule the committees of the ASA are larger than those of the PCBOC, which permits wider representation, but tends to slow up the development and final approval of standards. Also, it is proper to emphasize that certain provisions of the Uniform Code tend to reflect the construction practices and requirements of California which are often different and, in some instances, contrary to the requirements of other localities. This tendency is particularly pronounced in the masonry section of the 1943 edition of the Uniform Code, which was adopted by the conference in the fall of 1942. Many of the provisions of this section are influenced by the requirements of design to resist earthquakes and, if applied to other areas, would materially restrict the use of the types of masonry construction that have given satisfactory performance for many years in these localities.

On January 22, 1944, the American Standards Association approved the American Standard Building Code Requirements for Masonry which was developed by Sectional Committee A41 under the sponsorship of the National Bureau of Standards. Many of the provisions of the ASA standard conflict with the requirements of the Uniform Code and an effort is now being made, through a special committee appointed by the Pacific Coast Building Officials Conference, to reconcile these differences. It is hoped that this can be done and that eventually code provisions which apply to all sections of the country can be developed with supplementary requirements which may be adopted by municipalities in areas subject to earthquakes or wind storms.

HARRY C. PLUMMER,
Structural Clay Products Institute, Director, Engineering and Research, Washington, D. C.

Mr. Plummer is quite right in emphasizing the importance of the building code work of the ASA and in pointing out that some of the Pacific Coast Uniform Code provisions are of local rather than of national application. The point of the editorial was not that the Uniform Code is ready at hand for any city to adopt in toto, but that it and the procedure by which it is kept up to date offer "guidance and inspiration" for those "seeking suggestions for improving municipal building codes."—Editor

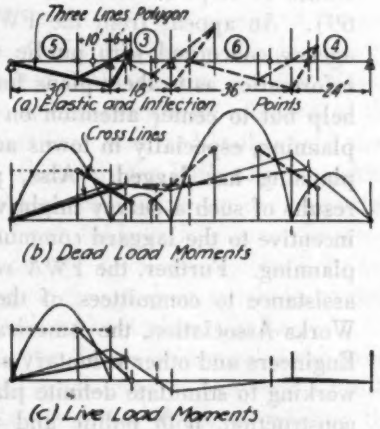
Continuous Beam Design

Sir—It is quite timely that Milton W. Rosenstein in his paper, "Bending Moments Distribution Directly By End Rotation Constants," published in *Engineering News-Record*, Jan. 13, 1944, p. 36, has shown a reduced balancing of moments in continuous beams. Mr. Rosenstein based distribution of moments on angular deformations of members. Further reduction in procedure of distribution of moments may be obtained with the graphics, which are also based on angular deformations of members.

Distribution of moments in a continuous beam considered by Mr. Rosenstein in his illustrative example may be performed in the following steps:

1. By construction of "three lines polygons," the elastic points at each support are determined as shown in sketch (a) of the accompanying drawing. It is interesting to note that in the beam considered the elastic points are at the supports. The inflection points, which were termed "fixed points," by Mr. Rosenstein may be determined by equations given in the booklet entitled, "Analysis of Continuous Frames by Graphical Distribution of Moments," by A. A. Eremin, published by the author. Mention of this booklet appeared in the New Book Section, *ENR*, Jan. 13, 1944, p. 58.

2. By construction of "cross lines" through the central moments one point on the closing line in each span is determined. The central moments



Graphical procedure for moment distribution is a continuous beam based on angular deformations.

ordinates on the vertical lines at the third points of spans may be determined either by intersecting with the closing line through the fixed end moments or by computing with the constants given in the booklet above referred to. With the known points on the closing line, the bending moment diagrams may be constructed as shown in sketches (b) and (c).

With similar graphical constructions the moments in continuous frames with haunched members may be determined. Errors in the moment determined by graphics on the ordinary letter size sheets is generally about 3 percent. For greater accuracy a larger scale should be used. The possibility to visualize operations of distribution of moments by graphics can not be overemphasized.

A. A. EREMIN,
Associate Bridge Engineer, California State Highways, Sacramento, Calif.

EDITORIALS

VOLUME 133 NUMBER 4

July 27, 1944

The Public-Works Survey

PLANNING FOR POSTWAR public works should be materially advanced by the nation-wide survey of such plans that has been undertaken by the Federal Works Agency at the request of the Committee on Postwar Economic Policy and Planning of the House of Representatives (*ENR* July 20, vol. p. 69). An appeal from the FWA to every public agency concerned with public works for detailed information as to their plans for such work cannot help but to center attention on the need for such planning, especially in towns and cities where the planning has lagged. Also, publication of the results of such a survey might well prove to be an incentive to the laggard communities to push their planning. Further, the FWA survey should be of assistance to committees of the American Water Works Association, the American Society of Civil Engineers and other voluntary associations that are working to stimulate definite planning for postwar construction, both public and private. There is none too much time left for postwar planning, as the signs of unrest in Germany and Japan serve to emphasize.

A Challenge to Engineers

WHEN A SPEAKER is so deeply stirred as to abandon completely the subject assigned to him in order to give voice to what he considers much more compelling thoughts, he is generally worth listening to. Such was the case with the talk of Carlton Proctor before the Metropolitan Section of the American Society of Civil Engineers, which is abstracted in this issue. Col. Proctor's purpose was to stimulate engineers to think about how to take full postwar advantage of the splendid training that engineers are receiving in the armed forces. He characterized the newly developed brain power of these men as a great national asset of inestimable value, if we will but plan to use it effectively. These men, he said, will have capacities beyond those required by their old jobs, hence it is up to American industry to be prepared to fit them into niches that will be worthy of their talents. Failure to do this will be a national calamity; success will contribute much to our winning the peace. Here is a challenge for the engineers at home who often feel that the profession is not being given its full share of responsibility in planning our postwar economy.

The Aviation Engineers

PERHAPS BECAUSE THEY ARE NEW to our army, perhaps because many of their early operations were veiled in secrecy or confused with the deeds of the better-known combat Engineers or general-service regiment Engineers, the Aviation Engineers have not been widely known or sufficiently appreciated. It is a situation that needs correction, for theirs has been a spectacular role in nearly all of our victories to date. In Tunisia, Italy, Burma and France, as well as on Pacific islands, they have built the front line airbases from which pursuit planes operated and the rearward bases from which the bombers set out. Sometimes as in Burma they have flown midget construction equipment or knocked-down standard size machines into enemy territory in planes and gliders. More often they get to the job by ship, by truck or on foot, just like any other soldier. A part of the Army Air Forces, the Aviation Engineers are among the war's most effective construction forces. How they are organized and trained, what they do, and how, is the subject of an article in this issue.

Defects in Timber

IN THE RUSH to "get the roof on", some substandard timber inevitably found its way into war buildings. In most cases nothing more serious than extra maintenance costs will result, since the majority of the defects are normal, stress-relieving shrinkage cracks. Nevertheless, some timber framing was designed by engineers not familiar with the peculiarities of the material, and some was built by incompetent and careless workmen, so that a few structures will require immediate and extensive repair to preserve them. As a consequence it is important to know what maintenance is required and when. As an aid in this direction, top engineers of the timber industry tell in this issue how to evaluate lumber defects—which are dangerous and require immediate replacement of a member, and which need no attention other than bolt tightening. Complete inspection, followed by evaluation of defects on the rational basis presented, plus mature engineering judgment, should prevent failure of timber structures as well as unnecessary replacements and repairs.

Collective Bargaining in Canada

THE LARGE VOTE cast by engineers in Ontario in favor of collective bargaining through an organization made up of engineers (*ENR* July 13, vol. p. 59) needs to be appraised in the light of its background in order to get its true significance. The vote was not on the question of approval of collective bargaining, but on what type of bargaining is preferred.

In April of this year the newly created Wartime Labor Relations Board of Canada exempted "persons employed in a professional capacity" from the provisions of the new federal labor regulations for six months in order to give representatives of engineers, architects and other professionals an opportunity to make up their minds as to the extent to which they would ask the board to exempt the members of their organizations from federal labor regulations. Representatives of the Ontario engineers went to the conference with the board fully convinced that if engineers were to have an effective voice in determining their pay and working conditions they would have to have some kind of collective bargaining organization. Others at the conference, notably the representatives of the conservative Engineering Institute of Canada, were not so certain of their position. The Ontario representatives came away from the conference unchanged in their view; the others came away convinced that their task was to crystallize the thinking of their members on collective bargaining, also that if they were to continue to seek exemption they must be prepared to offer their employee members a satisfactory substitute for the collective-bargaining provisions of the federal regulations.

It is against this background that engineers in this country need to weigh events in Canada. The board of direction of the American Society of Civil Engineers reached the conclusion last October that engineers on this side of the border need collective bargaining agencies of their own choosing if they are to be kept from being swallowed up in heterogenious groups in which they have little voice. That society now is in the throes of evolving some form of a bargaining agency that will be able to function under federal laws and yet will be devoid of characteristics that have made trade unions unacceptable to many engineers.

The A.S.C.E. stands almost alone—and not wholly united—in what it has undertaken. Within its own ranks there still is a strong demand that it abandon the steps already taken in favor of attempting to amend the federal labor laws to exclude professional men from their provisions. Outside of its own ranks, it has as yet received no support from the other Founder Societies nor from any of the state societies of professional engineers.

In the light of current trends in labor legislation, the approach to collective bargaining for engineers taken by the Canadians is far more realistic than that of engineers at large in this country.

Military Bridge Revolution

WITH THE LIFTING of one little corner of the veil of secrecy hiding military bridge designs by the release of limited information on the Bailey "panel" bridge, a first glimpse is afforded of the great changes that have occurred in this field since the war began. Certainly the Bailey bridge, which the British designed and which we use in preference to some of our bridges, is a great improvement over prewar types; the news pictures in last week's issue suggest this, and an article to be published Aug. 10 will make it plainer still.

Not only does the Bailey bridge solve the problem posed by the great increase in weight of military vehicles, but it comes closer to meeting the classic and seemingly impossible objectives of military bridge design—lightness, simplicity and universal adaptability to terrain and loads—than ever before in history. As one reads dispatches telling of our bombing of every bridge over the Seine between Rouen and Paris and over the Loire from Nantes to Orleans, the great usefulness of the Bailey bridge becomes evident. By erecting these military spans on the old piers, we will eliminate the necessity for pontoon crossings or tediously-built trestles that would halt river traffic; and we have bridges strong enough to take our road traffic, however heavy. In the meantime, lighter Bailey assemblies—either on pontoons or piers—will afford crossings of the many Normandy streams in the path of our advance, crossings which can be built almost as fast as the Germans can destroy the original bridges.

A revolution has indeed occurred in the military bridge field, a fact that will probably be plainer still when censorship is lifted further.

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Fig. 1. Our first airfield in France was in use 60 hr. after the invasion began.

Aviation Engineers Build, Maintain and Fight

A. N. Carter
Assistant Editor, Engineering News-Record

***Contents in Brief**—U. S. Aviation Engineer battalions specializing in the construction of airports are building bases in many parts of the world. Standard size construction equipment is used generally, and in some cases this machinery is dismantled and transported to the working site in cargo planes and gliders for reassembly. A small percentage of the battalions, known as Airborne Aviation Engineers, are equipped with bantam tractors, graders and other machines of a size that can be transported by air without disassembly. Before leaving this country the troops receive intensive training in combat operations, surveying, camouflage, construction methods, and in the use, repair and maintenance of construction equipment.*

AVIATION ENGINEER SYMBOL

Symbol of the Aviation Engineers is a winged bucking bulldozer holding a piece of pierced landing mat. The driver is fully equipped to build or fight. The driver and the bulldozer are "fighting mad". It signifies construction of airdromes near the front lines in a hurry to "Keep 'em Flying". Army forces reproducing the symbol use the blue and gold colors of the Army Air Forces and the red and white of the Corps of Engineers.

AMONG THE FIRST Allied forces to land in the invasion of France were Aviation Engineer troops, the airbase construction specialists of the U. S. Army. Sixty hours after the invasion started, Allied aircraft were using runways and flight strips the Aviation Engineers had built.

Just as these new bases are proving to be of great value in the fighting in Normandy, other airdromes built previously by the Aviation Engineers in double-quick time are playing an important part in the campaigns in Italy, the Pacific, and the China-Burma-India area. The work of Aviation Engineers in providing airfields near the front and making air support possible also contributed in no small measure to the success of the Allies in North Africa and the Aleutians.

Known in Army terminology as engineer aviation battalions, the Aviation Engineers were organized in June, 1940. At that time the 21st Engineer regiment was redesignated as an engineer aviation regiment to form the nucleus for the organization, now consisting of 340 units totalling over 100,000 officers and men, of which about 90 percent are overseas. Most of the battalions travel on the ground, but some are airborne. They are distinct from the airborne infantry troops, which are organized primarily to fight and not to construct.

Aviation Engineer units do the bulk of the construction work for the Army Air Forces. Their principal task is to build self-contained airbases near the front lines. This means that in addition to constructing runways and taxiways, they must also provide

water supplies, sewage disposal facilities, housing, roads, aviation gasoline fueling systems, communications and power facilities, pipelines, and occasionally, wharves and docks for delivery of supplies and men. This varied construction, often under fire, requires battalions highly trained in the use of construction materials and equipment.

Although trained primarily to construct and maintain airfields, the units also are provided with weapons to defend their positions and bases when required. A regular battalion packs more firepower than a World War I infantry brigade, its weapons including four M16 multiple anti-aircraft mobile machine guns, twenty-two 50-calibre and anti-aircraft machine guns, eight mortars, 32 bazookas, 786 rifles and carbines, and three 45-calibre pistols. In addition, the units are equipped to repair and to maintain their construction equipment and weapons.

Personnel of battalion

A standard battalion of the Aviation Engineers (Table I) consists of 33 officers and 774 enlisted men. This group is broken up into a headquarters and service company, including 226 enlisted men, three other companies each containing 178 enlisted men, a medical staff of three officers and 14 enlisted men, and a chaplain.

The commissioned staff of each battalion is made up of officers of the Corps of Engineers. Though assigned to the Army Air Forces, they continue to wear the castle insignia. Some are West Point graduates, others are reserve officers, and still others are specialists commissioned from civilian life, but the greater number are graduates of officers candidate schools.

The enlisted personnel are generally men with previous experience on heavy construction and related work. A breakdown of the classification of these men is given in Table II.

Part of air forces

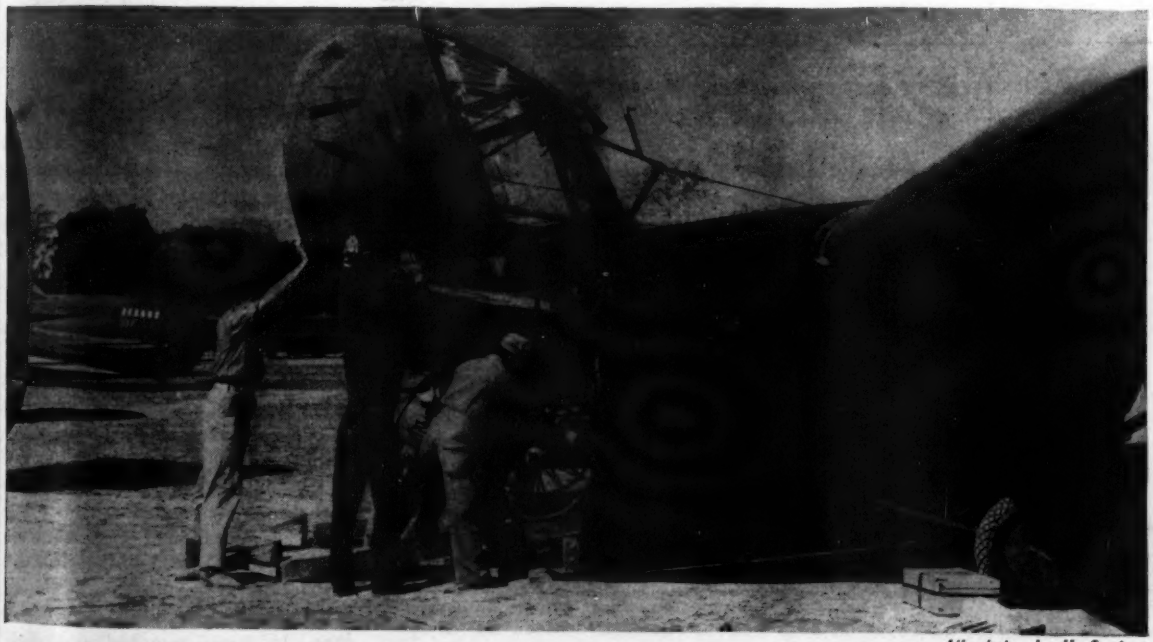
The Aviation Engineers are headed by a general officer, having the title of Air Engineer on the staff of the Commanding General, U. S. Army Air Forces, and are an integral part of that organization. However, in some war theaters where major construction projects exist, it sometimes has been found more convenient to place Aviation Engineer units under the control of Army Service Forces. On technical questions the Air Engineer works closely with the Chief of Engineers, who procures all engineer equipment and construction supplies for the Aviation Engineers, based on the requirements set up by the Air Engineer. The Office of the Air Engineer has been the originating agency for many of the construction techniques, materials, equipment and structures used by the Aviation Engineers in the combat theaters, but the details of these ideas were worked out by the Engineer Board of the Office of the Chief of Engineers.

Few, if any, army battalions require more equipment per man than the Aviation Engineer units. The major pieces of construction equipment used by a standard battalion, plus those needed for water supply and temporary lighting facilities, are given by Table III.

Large shipping space required

The large amount of shipping space required to deliver this equipment to a war zone is impressive. That needed to transport the equipment for a single fully equipped battalion totals about 7,440 measured tons of water shipping space or about the capacity of one Liberty freighter. The total figure is divided as follows: Vehicles and mechanical equipment, 6,425 tons; maintenance for battalion for 30 days, including 1,000 drums of gasoline, about 275 tons; and 740 tons of subsistence and small packages.

The equipment listed in Table III is all standard-size machines, and is typical of that employed by most battalions. In addition, about ten per-



All photos by U. S. Army

Fig. 2. ***Airborne Aviation Engineers load a bantam grader in a glider for use 200 miles behind the Jap lines in Burma.***

cent of the units, those known as Airborne Aviation Engineer Battalions, use the light-weight midget or bantam construction equipment that can be transported by air without disassembly (Fig. 2). These special machines include: a 20-hp. crawler tractor, a 23-hp. rubber-tired tractor, a 1½-yd. scraper, a ½-ton two-wheel dump trailer, a 1-ton cargo trailer, a small smooth roller to which lugs may be added to make it a sheepsfoot, a midget grader pulled by a jeep, a ¼-ton truck, a trailer-mounted asphalt kettle, a towed rooter, a soil-stabilization mixer, a tractor-drawn mower, and a 1½-kw. electric power plant.

The battalions using the small-size equipment contain less men than the standard units. They have 28 commissioned officers, one warrant officer, and 502 enlisted men, making a total of 530. The earthmoving and grading machinery assigned to each of these airborne battalions includes: nine 1½-yd. carrying scrapers, seventeen ½-ton dump trailers; nineteen 23-hp. bulldozers; two 1/3-yd. shovels, and seven 6½-ft. towed graders.

A recent example of the outstanding work of the airborne units using small size equipment was that of a glider-borne company behind the Jap lines in Burma. Only 4 tractors, 1 grader, 2 scrapers, and 1 jeep were originally flown into the job, and of these 1 tractor and 1 scraper were lost in crashes. However, with the remaining equipment the unit did a large amount of work in a short time, including the construction of a transport plane strip in less than 24 hr.

Fig. 3. Brig. Gen. Stuart C. Godfrey, formerly air engineer in the Air Forces, was a pioneer in the development of airborne construction operations.

TABLE I—PERSONNEL OF ENGINEER AVIATION BATTALION

	Headquarters and Headquarters Company	3 Companies (Each)	Total	Medical Section	Chaplain	Aggregate
COMMISSIONED						
Lieutenant colonel	1	.....	1	.....	.....	1
Major	2	.....	2	.....	.....	2
Captain	3	1	6	2	1	9
First lieutenant	3	3	12	1	.....	13
Second lieutenant	5	1	8	.....	.....	8
Total commissioned	14	5	29	3	1	33
ENLISTED						
Master sergeant	3	.....	3	.....	.....	3
First sergeant	1	1	4	.....	.....	4
Technical sergeant	5	.....	5	.....	.....	5
Staff sergeant	9	6	27	1	.....	28
Sergeant	9	11	42	.....	.....	42
Corporal	10	13	49	1	.....	50
Technician, grade 3	8	.....	8	1	.....	9
Technician, grade 4	31	13	70	1	.....	71
Technician, grade 5	79	60	259	5	.....	264
Private, first class	26	29	113	2	.....	115
Private, including basic	45	45	180	3	.....	183
Total enlisted	226	178	760	14	.....	774
Aggregate	240	183	789	17	1	807

TABLE II—TYPES OF JOBS IN AN ENGINEER AVIATION BATTALION

Classification	*Number*	*Classification*	*Number*
Antiaircraft machine gunner	15	Mess sergeant	4
Automotive equipment mechanic	14	Mine detector operator	9
Automotive equipment operator	76	Mortar gunner	6
Automotive repairman	4	Motor transportation sergeant	5
Blacksmith	5	Motor transportation assistant	3
Bricklayer	27	Painter, general	9
Bugler (also messenger)	4	Painter, sign	1
Camouflage technician	13	Parts clerk, automobile	1
Carpenter, construction	48	Personnel sergeant	1
Clerk—typist	14	Photographer	1
Communications chief	1	Platoon sergeant	9
Construction foreman	58	Plumber	5
Cook	18	Radio operator	10
Cook's helper	9	Radio repairman	1
Classification specialist	1	Rigger	21
Demolition specialist	27	Rodman and chainman, surveying	2
Diesel mechanic	4	Sergeant major, battalion	1
Draftsman	6	Soils laboratory assistant	1
Electrician	28	Stenographer	1
Engineman, operating	13	Structural steel worker	3
Engineman, serviceman	7	Supply clerk	5
Filter unit operator	5	Supply technician	3
First sergeant	4	Surveyor	2
Heavy automotive equipment operator	47	Surveyor, topographic	1
Heavy machine gunner	4	Telephone switchboard operator	1
Highway construction machine operator	64	Terminal supervisor, petroleum products	3
Highway construction machine supervisor	5	Toolroom keeper	15
Jackhammer operator	27	Tractor driver	4
Leather and canvas worker	1	Utilities technician	1
Lineman, telephone and telegraph	3	Water supply man	1
Machinist	2	Welder, combination	5
Mail clerk	1	Basic (Have had military training only)	68
Master mechanic	1	Total	760
Message center chief	1		

Mostly standard size equipment

But experience has revealed that construction of the long runways required for heavily loaded military aircraft in the short time generally available can best be done with standard-size construction equipment. Thus, most of the battalions are supplied with the latter equipment, although they may be airborne.

The methods followed in transporting the standard-size equipment by air are based on studies at Fort Belvoir and in the field. Although such a scheme requires dismantling and reassembly of most of the machines, experience has revealed no unsurmountable difficulties.

Work to date has been based upon the use of C-47 transport planes, although the use of aircraft carrying heavier loads is being studied. The weight of tools, loading equipment, extra flooring, and personnel accompanying each shipment dictates that the subassemblies of the construction equipment be not much heavier than 4,000 lb. each. This restriction means that a single D-7 tractor, which weighs slightly less than 16 tons, requires eight C-47 planes for its transportation.

Fig. 4. Col. George Mayo, air engineer on the headquarters staff of the Air Forces, is now the commander of the Aviation Engineers.

TABLE III—EQUIPMENT OF AN ENGINEER AVIATION BATTALION

Item	Number of pieces	Item	Number of pieces
Semi-trailer, 10-ton	1	Shovel, crawler-mounted ¾ cu.yd.	2
Air compressor, trailer mounted rubber-315 cfm.	1	Sweeper, rotary, tractor-powered	1
Air compressor, truck-mounted, 105 cfm.	3	Tank, asphalt, trailer-mounted, 1,500-gal.	2
Crane, tractor-operated, 20-ton	1	Tractor, crawler type, 70 to 90 hp. with bulldozer attachment	11
Crane, truck mounted, ⅜-cu.yd.	1	Tractor, rubber-tired, 30 hp.	2
Distributor, bituminous, trailer-mounted, 1,250-gal.	1	Water supply equipment, engineer set.	1
Ditching machine, crawler-mounted	1	Welding equipment set, electric arc, 300-amp. trailer-mounted	1
Dolly, 4-wheel tandem, 4 dual tires	14	Welding equipment, oxyacetylene set	3
Electric lighting equipment, 3-kva.	3	Carbine, cal. 30	156
Electric lighting equipment, 4.5-kw.	1	Carriage, motor, multiple gun, M16, with armament	4
Grader, motorized, 12-ft. moldboard	8	Gun, machine, Browning, 50 cal., M2	16
Grader, towed, leaning wheel	2	Gun, machine, Browning, 50 cal. HB	6
Heater, asphalt, trailer-mounted	1	Gun, submachine, 45 cal., M3	27
Ketttle, asphalt, trailer-mounted	4	Launcher grenade, M7	65
Lubricator, trailer-mounted	4	Launcher grenade, M8	17
Mixer, concrete, 14-cu.ft. trailer-mounted	1	Launcher, rocket, 2.36 in., M9	32
Mixer, rotary tiller, trailer-mounted	2	Mortar, 60-mm, M-2	8
Mower, tractor-drawn, 7-ft. cutter bar.	1	Pistol, automatic, 45 cal.	3
Power plant, 5-kw. trailer-mounted	1	Rifle, 30 cal.	603
Pump, asphalt, trailer-mounted	1	Trailer, ¼-ton, 2-wheel, cargo	16
Pump, 166-gpm. centrifugal	4	Trailer, 1-ton, 2-wheel, cargo	18
Pump, 100-gpm. diaphragm	4	Trailer, 1-ton, 2-wheel, tank 250-gal.	8
Pump, water, trailer-mounted	1	Truck, ¼-ton, cargo	17
Roller, road, gasoline engine driven, tandem 2-axle, 5- to 8-ton	2	Truck, ¾-ton, ambulance	1
Roller, road, 3-wheel, 10-ton	1	Truck, ¾-ton, weapons carrier	10
Roller, road, towed, sheepsfoot, 2-drum in line	3	Truck, ¾-ton, weapons carrier, with winch	1
Roller, road, towed, 13 rubber tires	2	Truck, 2½-ton, cargo	9
Rooter, road, cable operated, 3-tooth	1	Truck, 2-½-ton, cargo with winch	1
Scraper, road, motorized, 12 cu.yd.	3	Truck, 2½-ton, gasoline tank, 750-gal.	1
Scraper, road, towed, 8 cu.yd.	7	Truck, 2½-ton, dump	37
Semi-trailer, low bed, 20-ton	14	Truck, 4-ton, dump	14
Shop equipment, motorized:		Truck, 4-ton, wrecker, complete	1
General purpose repair	1	Truck, tractor, 4- to 5-ton	1
Machine shop heavy	1	Truck, 6-ton, prime mover	6
Shop equipment, welding set	1	Detector, set	12
		Radio set	5

In planning the disassembly of the heavy equipment, every effort is made to keep the subassemblies as large as possible to minimize the dismantling work. Considerable thought also is given to the sequence of reassembly. The parts needed first for reassembly are grouped in the first planes, and all parts and subassemblies are marked to avoid confusion and to expedite the reassembly work.

Various methods of moving heavy pieces of equipment inside the plane have been tried. The most successful of these has proved to be the use of two 2x12-in. longitudinal timbers laid flat on the floor of the plane to distribute the load over a large floor area. By greasing the timbers and using a sled, equipment may be moved forward with ease. For handling especially heavy or bulky pieces of equipment two sleds are employed. When sufficient hand labor is lacking to skid the load forward in the plane, a block and tackle arrangement is used.

Some parts cut down

Some parts of the heavy equipment, such as the box frame of carrying scrapers and the booms of shovels, are of a size and shape that prohibits their being loaded as a unit into a C-47 transport. In such cases it is necessary to cut down the part with acetylene torches and to install bolted joints. Installation of the bolted joints of this type is usually done in advance of the airborne mission, which expedites the actual dismantling, loading, unloading and reassembly on D day. The bolted joints can, of course, be made just as strong as the original equipment.

Records kept on the manhours required to dismantle, load, unload, and reassemble different pieces of construction equipment revealed that a D-7 tractor equipped with an angle-dozer and power control unit—one of the heaviest pieces to be carried—can be dismantled, loaded, unloaded and reassembled by four men in 280 hours time. Of this total, 90 hours were consumed in dismantling the unit and in marking the parts for loading, 42 hours in loading the pieces, 23 hours in unloading, and the remaining time in reassembly.

No description of the Aviation En-

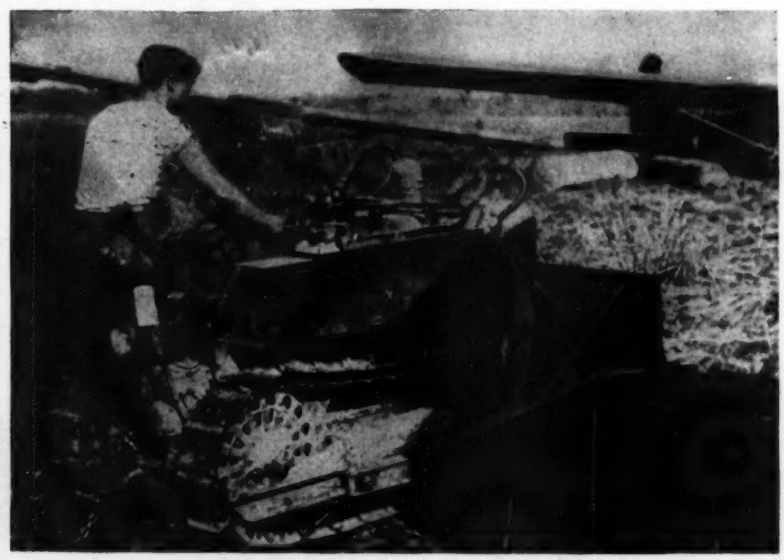


Fig. 5. This bantam bulldozer, as well as other airborne equipment, was used immediately on its arrival behind the Jap lines in Burma to complete a transport strip within 24 hr.

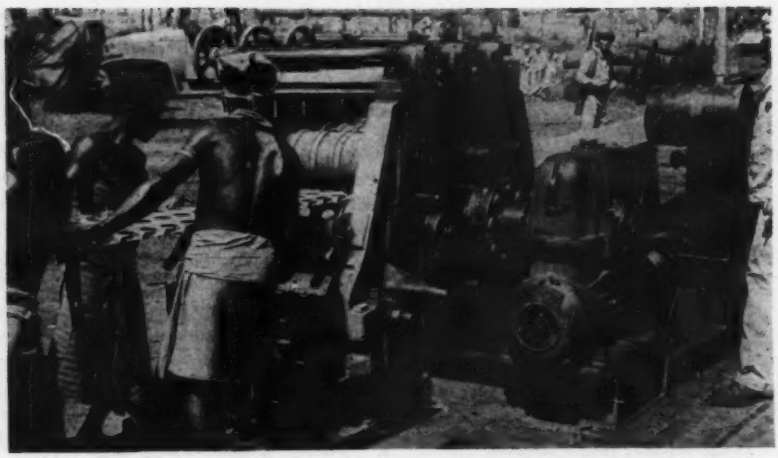


Fig. 6. Soon to be standard with all Aviation Engineer battalions is a machine for straightening pierced mat. One of the first units used in the war zones was operated at Port Moresby, New Guinea, with native labor.

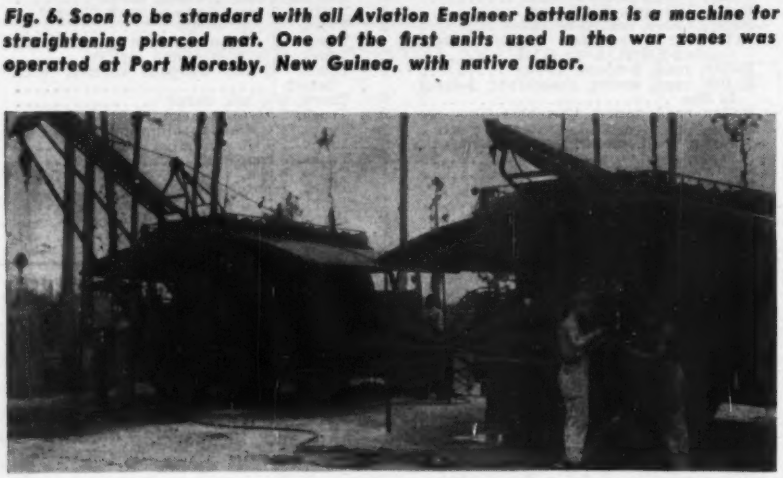


Fig. 7. Each battalion is equipped with self-contained mobile repair shops making possible a wide variety of maintenance and rebuilding operations.

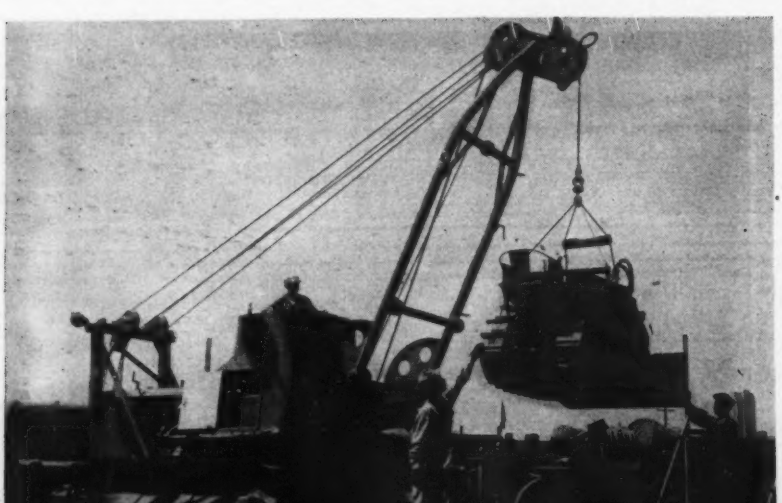


Fig. 8. One of the newest pieces of equipment to be used by the Aviation Engineers is a specially equipped "beachdozer", shown here picking up a bantam bulldozer that may be transported by air without disassembly.

gineers and their equipment would be complete without mention of special materials and structures used by the battalions. These include steel pierced plank landing mats, pipelines with joints of a type permitting rapid installation and disassembly, bolted-steel gasoline storage tanks, portable combat hangars with canvas or steel covering, and prefabricated wood and metal buildings. To permit more effective use of the steel mat, which is occasionally damaged in service, a mat straightening machine was recently developed and will soon be in all overseas theaters.

Construction of airfields to accommodate the new Superfortress, the B-29, used to bomb Japan, presented the major problem of providing runways of adequate strength to withstand greater wheel loads. Last fall the Air Engineer initiated a series of studies to determine how this might be done. An interesting part of this study was the use of landing mats made of timber, which proved to be one of the strongest and most durable mats developed to date. Consisting of 2x4-in. timbers placed on edge and nailed together, this mat approaches permanent construction. However, a major objection is that a runway 150x 5,000-ft. will require over two million board feet of timber, which means that a large amount of time must be consumed to produce that amount of lumber in sawmills of the type used by the Aviation Engineers.

Other recent contributions of the Air Engineer to the work of the Aviation Engineers have been the development of an aluminum landing mat weighing about one-half as much as steel but of equal strength, and—to replace steel tanks—aluminum bolted gasoline storage tanks of a type that can be dismantled and moved ahead as a campaign progresses. These new items are the natural outgrowth of the requirements for lighter materials for airborne operations.

Troops get intensive training

Successful use of the special structures, materials and equipment just described, under the rigorous conditions of a war front, requires that a battalion be given intensive training before leaving the United States. Most Aviation Engineer battalions now receive their specialized training at Geiger Field in Washington and McDill Field in Florida.

To witness this training procedure first hand, the author visited McDill Field and some of the auxiliary bases, which include nearby Drew Field and establishments at Avon Park and Tallahassee, Fla., and Greenville, Ala. At those fields the Aviation Engineer troops are given intensive fundamental training in class rooms and work shops, but they obtain most of their "know how" in the field on actual construction projects simulating theater-of-operations conditions.

Following fourteen weeks of basic work, which consists primarily of training the men to be soldiers, a typical battalion gets about four months of specialized training before being sent overseas. Training at McDill includes classes for diesel mechanics, blacksmiths, carpenters, electricians, surveymen, welders, camouflage technicians, filter unit operators, boils technicians, well drillers, painters and skilled workers for demolition, mining, and mine-removal operations.

Classes vary in size from one student per instructor for equipment operators to ten for draftsmen, utility repairmen and topographers. Time spent in classes varies from four weeks for painters, demolition specialists, and some other groups, to sixteen weeks for machinists and diesel mechanics.

Emphasis on practical experience

Instructors are officers versed in construction and related problems. Believing that there is no substitute for actual experience, these men soon have their students engaged on operations providing practical work. For example, the student carpenters at McDill were building a large assortment of cabinets, shelves and office equipment needed for work under way at the airbase, the tinsmith classes were doing the metal work required in constructing a small number of new buildings, and the machinists and repairmen were overhauling and rebuilding several pieces of heavy construction equipment, including the building up of parts by welding. Other groups were engaged in equally practical training.

Because of the care with which the men for the Aviation Engineers battalions are selected, the results obtained with the short courses have been very encouraging. However, the training methods now being used were

Fig. 9. Provision of a suitable water supply is an important part of the work of constructing many airfields. Frequently, as was done at Baker Island, water distillation units must be set up on the beach and the ocean used as a source.

Fig. 10. Many battalions find trucks rigged with cranes especially valuable.

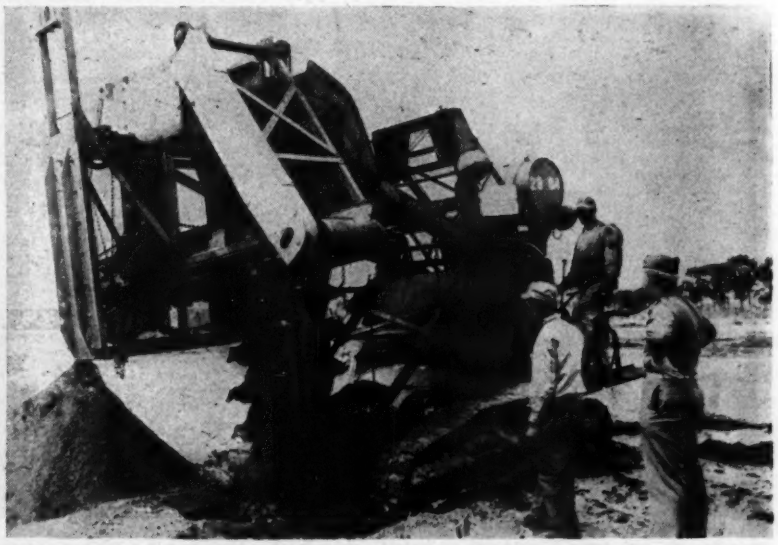


Fig. 11. Classes for operators are kept small in order to provide the maximum experience in actual operation of construction equipment.

Fig. 12. Special structures used by the Aviation Engineers include portable steel-frame hangars which may be assembled in a short time with little equipment.

not developed until after considerable experimentation. Early in the war, considerable emphasis was placed on the use of movies, lectures by specialists from equipment manufacturers and other outside organizations, and more class room work, depending of course on the subject being taught. But time revealed that much better training resulted by reducing the classroom periods and increasing the time spent on practical construction problems.

Experience also revealed the great value of assigning the battalion to some construction job where it could operate by itself as a unit. Thus, as soon as possible each battalion is ordered to a satellite airfield and assigned construction problems of the type met in the war zones.

For example, a trip to the Avon Park, Fla., airbase revealed that the 1899th Battalion was building a short highway across a swamp, clearing the right-of-way for another road, applying the wearing course on a landing strip, and driving bridge piling. Added work soon to start included construction of a soil-cement flight strip. All of these operations were not only of a type encountered in the combat theaters, but they were on work that needed to be done.

Proof that the engineers in training receive effective instruction is well illustrated by a recent training operation carried out by the 926th Engineer Aviation Regiment. The problem was to lay the steel pierced plank for a 150x4,380-ft. runway, the men to move into bivouac on the site and live under field conditions. The 926th laid 323,932 sq.ft. in 57 hr. 10 min. or 144.5 sq.ft. per man-hour, which is considered rapid work.

But much better records are being established by the battalions in the theater-of-operations areas. In the Aleutians, the 807th Battalion constructed in eight days a fighter strip

Fig. 13. Construction of outlying airbases in the war zones offers, in the early stages of the work, many difficult supply problems. Frequently, food for the troops, as well as some equipment, must be flown in and dropped by parachute, as at this base on a South Pacific island. Note the pierced mat already in place for runway surfacing.

the sand-and-marsh bottom of a dal lagoon. The lagoon bed, which ecame a creek bed at low tide, was rained by diverting the creek at its ead and building a gate at the sea-ard end. The landing mat for the 00x3,000-ft. runway was put down two days.

At Bone, Algeria, a battalion of e 21st Regiment, built in two weeks permanent Coastal Command air-ase with a 150x6,000-ft. steel pierced lank runway.

A landing field of two runways, one ,000 ft. long and the other 4,500 ft., nd 70 hardstandings at Tsili Tsili, 0 miles from Lae, New Guinea, was onstructed in 3 weeks by the 871st irborne Battalion. Later, facilities ere added to make this an important ase.

At Sbeitla, Tunisia, the 814th Bat-alion spent only three days in build-ng five landing fields requested by an ir support commander. At Ben rouba, Tunisia, the Aviation Engi-eers removed 1,788 mines from a ingle runway of a captured German ase. The job was done in 8½ hours, with no casualties from detonated mines.

Baker Island, a tiny Pacific land spot 600 mi. east of Tarawa, was transformed into a complete forward bombing base in ten days by the 804th Battalion. This work included construction of a 3,700-ft. steel mat runway, which was later extended to 5,500 ft.

Other outstanding records are being established by the Aviation Engineers in the European, Pacific and China-Burma-India areas.

Experience in the Pacific theater has shown that one of the most effective airborne operations in driving back the enemy is to use gliders and transport planes to deliver midget equipment to a level area relatively free of obstructions and frequently behind the enemy's line. Then, after the bantam machines have been used to construct a primitive temporary flight strip at this site, standard-size dismantled construction equipment is flown in and a larger and more satisfactory airbase constructed. Generally, because of drainage and other conditions, plus the fact that the choice of the first site depended almost solely upon whether landings could be made with the area in its original condition, it is necessary that the larger base be constructed at a new location nearby.

In conclusion, it must be pointed out that a general concept among laymen is that the U. S. Air Force is a highly mobile organization; but military strategists know that it is only as mobile as the speed with which airfields can be constructed. The Aviation Engineers by solving the problems of rapid construction under wartime conditions have supplied this necessary mobility and permitted our Air Force to "keep on top of the enemy" at all times. The work of the Aviation Engineers has also added emphasis to the fact that American engineers, who have the reputation of being the world's greatest earthmovers, with their construction "know how" and their sturdy, efficient equipment developed for peacetime use, can hold their own when building under battlefront conditions.

Fig. 14. In the battle for the Aleutians, airfields built by the Aviation Engineers played an important part. Rapid progress building these fields resulted from the skillful use of much heavy construction equipment, which contrasted sharply with the hand tools and narrow-gage railroads used by the Japs.

Waterworks Financing in Latin America

***Editor's Note**—Unlike practice in the United States, where waterworks are financed by municipalities, it is customary in Latin America for the federal or state governments to undertake the construction of such local improvements. This was explained in a paper by Lt. Col. H. B. Gotaas and Maj. R. D. Mitchell, chief and assistant chief engineer, respectively, of the health and sanitation division, Office of the Coordinator of Inter-American Affairs, presented at a recent conference of the American Water Works Association. Following are excerpts from this paper.*

FINANCING of water supply improvements is primarily a function of the federal governments in the majority of the Latin American countries. In a few countries some of the older supplies were constructed by private companies, but in most cases the federal or State government is carrying on the work today and at the same time is gradually acquiring the private properties.

The trend toward governmental ownership has become extremely widespread in Latin America, perhaps due to the fact that in many countries all taxes go to the federal government, which in turn finances improvements. The following table indicates practice in financing:

Type of Financing	Number of Countries
Federal or state funds	13
Local funds	3
Combination of funds	4

Interesting methods of financing are used in several countries. In Colombia, for example, for the most part the construction of water supplies is financed by the combined funds of federal state, and city governments. The tax money allotted to municipal improvements is controlled by an organization known as the Fomento Municipal. This organization earmarks a part of the money for the construction of waterworks and sewerage. The usual practice is for the federal government to furnish 60 to 70 percent of the costs. Seventy percent is given by the federal government when the municipal budget is less than $6,850 a year. The state and city together make up the remainder.

The federal government gives its share in materials rather than money; if the value of the materials does not equal the government's share, the balance is paid in cash. This system effects a savings for the government, since the materials are purchased in large lots, and it also provides a definite control on the quality of the materials inasmuch as these are purchased under the specifications of the engineering department of the Ministry of Labor, Health and Social Welfare.

Practice in Mexico

In Mexico three methods of financing are in vogue. Where it appears financially possible to obtain a satisfactory return on the investment, the Banco Hipotecario will construct a water supply system in a community and retains ownership of the system until the investment is amortized. If additional improvements are made, this cost is added to the original investment charge.

After the investment is paid off the system may be turned over for future operation to an organization known as the "Committee for Public Improvements." In selected communities the federal department of health, through its Division of Potable Water, develops water supplies and operates them. These communities are also preferably those where a satisfactory return on the investment may be obtained. A system financed in this manner may also be turned over to the "Committee for Public Improvements" for operation.

Local financing is only done in the case of several of the largest cities in the country, or by the state government, which may develop and finance the system and turn it over to the "Committee for Public Improvements" to operate.

At the present time the Banco Hipotecario is believed to have constructed the greatest number of systems in Mexico.

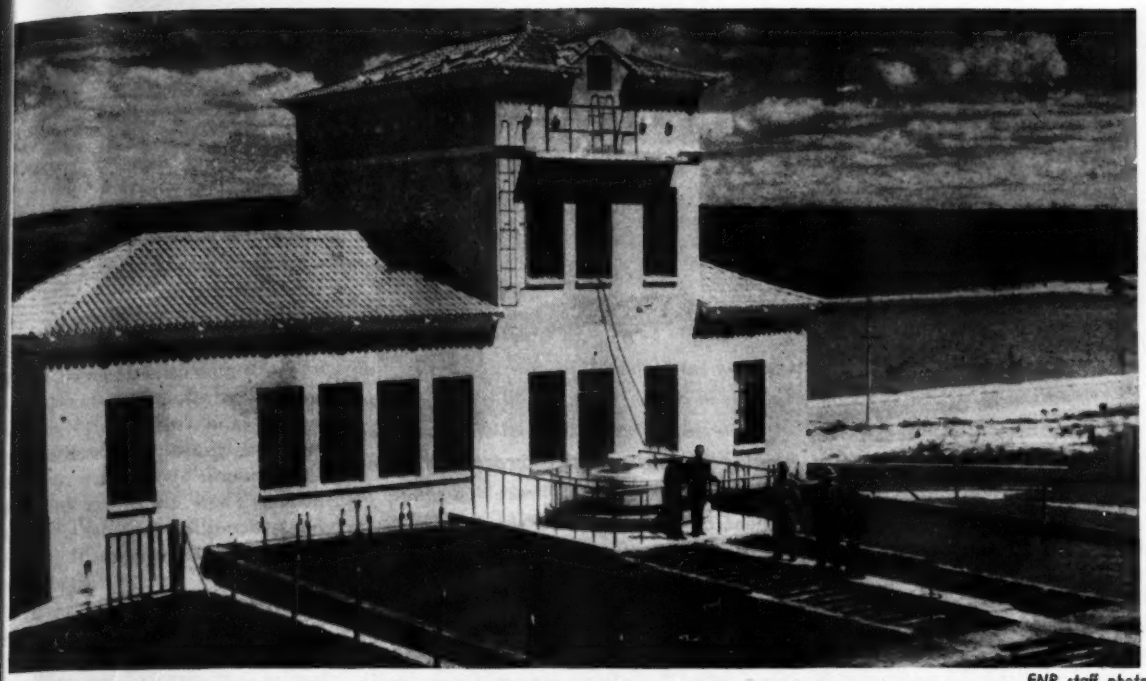
Ownership of supplies

Private ownership is of minor importance in most countries although in Cuba thirty-one out of forty supplies are owned and operated by private companies. Six private companies are operating in Colombia, although plans are under consideration to purchase these systems. Other private systems are operated on a limited scale in Guatemala, Honduras, Nicaragua, Panama, and elsewhere. They are relatively few in number, however, and it is probable that there are no more than 75 privately owned and operated supplies for municipalities in all of Latin America.

While a considerable number of supplies have been designed and built by private organizations, as a whole present day studies and plans are made by either the Ministry of Public Works or of Public Health. The Ministry of Public Works is more important in this respect, and in only a few countries does the Ministry of Public Health play an important part in designing new projects. Foreign consulting engineers are occasionally engaged by the Ministry to aid in making the studies and designs.

The consulting water supply engineer as he is known in the United States is almost non-existent in most of the countries. An outstanding exception is Colombia where about 80 percent of the design work is done for the Ministry by private consulting engineers or contracting firms. Even in Colombia, however, the relationship of consulting engineer to client is modified by the fact that the client is essentially the state rather than the municipality.

Outside of Argentina, Brazil, Chile, Colombia, Mexico, Uruguay, and Venezuela, there is very little treatment of water except occasional, in-



ENR staff photo

Recently completed at Belo Horizonte, Brazil, this rapid-sand water filtration plant is equipped throughout with the latest North American mechanical equipment. Built to serve a residential suburb of the city with a population of 12,000, the plant has a designed capacity of 600,000 gal. a day. Chloramine treatment, which is provided as an adjunct to filtration, is said to be effective in the control of schistosomiasis; the latter is a water-borne disease caused by a parasite of which the host is a freshwater snail common to tropical countries.

adequate chlorination. Argentina, Cuba, Uruguay, and Panama are the only countries using groundwater to any great extent. Surface waters, rivers, and springs sometimes supplemented by infiltration galleries, form the major portion of the supplies.

According to the 1941 annual report on "Sanitary Works of the Nation," Argentina had some nine rapid sand filters and eleven slow sand filters. In Chile twelve communities are served with rapid sand filters and eight with slow sand filters. Three pressure type filtration plants operate in Cuba. Colombia has two pressure filter installations, twenty-two rapid sand filter plants in operation with eight more under construction. Mexico has seven rapid sand filtration plants and a number of slow sand filter installations. Of Uruguay's public water supplies 82 are filtered and 38 are from wells. Venezuela has four water filtration plants, two in operation and two under construction.

Design standards and practices quite generally follow those of the United States, although less mechanization is ordinarily used. Mechanical equipment purchased in recent years has largely come from this country. Early in the century much pumping equipment and pipe was of European make and even a few years ago European cast iron pipe could be bought more cheaply in many localities than that made in the United States and had the additional advantage of being in metric sizes. It is often found that pumping and pipe line equipment is of European make, while filtration and chlorination equipment more commonly originated in the United States.

How Chlorine Kills Bacteria

Although chlorine compounds have been used as germicidal agents for more than half a century, we are still uncertain how chlorine and chloramine compounds destroy microorganisms in water stated Dr. S. L. Chang of the department of sanitary engineering, Harvard University, in a paper presented before the annual meeting of the American Water Works Association.

Dr. Chang reported that his early studies revealed that in the process of destruction of these organisms there is a penetration of chlorine into the organisms and that the cytological changes noticed in the chlorinated cysts indicate that the death of the cysts is probably a result of structural changes.

Recent experimental work on the mechanism of destruction of cysts of *E. histolytica* lead to these conclusions: The action of chlorine and chloramine compounds on cysts may be attributed to the active chlorine, which oxidizes or chlorinates the proteins in the protoplasm. The possibility of action from nascent oxygen liberated by hypochlorous acids was indirectly studied, and the evidence strongly indicated that this was unlikely to occur. The cyst-penetrating powers of various chlorine compounds, listed in the order of their activity, is: Gaseous chlorine, hypochlorous acid, Halozone, dichloramine, succinchlorimide, and monochloramine. The greater the concentration of titratable chlorine, and the longer the contact period, the greater was the penetration of chlorine.

Veterans—Our Number One Resource

Carlton S. Proctor
Consulting Engineer, New York
(Former colonel, Corps of Engineers, U. S. Army)

***Editor's Note**—An exceptional statement concerning the obligations of engineers in this country to their fellows in active service overseas was made recently by Carlton S. Proctor to the Metropolitan Section of the American Society of Civil Engineers. Col. Proctor had just resumed his active practice as a consulting engineer after recovery from an injury received while in command of a special-service regiment of engineers with the Persian Gulf Command. A condensation of his talk is given below.*

FROM THE TIME OF MY RETURN to civil life I have felt that if peace were to be declared today, we as a country would probably be nearly as unready for that peace as we were before the last armistice. My own analysis is that basically the reason for our unreadiness is that we are as a group, either consciously or subconsciously likening conditions of this war and the conditions that will obtain at its conclusion with those of the last war, and therein is our big mistake.

We are not in step with the boys that I knew as members of the armed forces overseas; we are not thinking as they do. Yet if we can bring ourselves to do that, clearly, straightly and realistically, I am confident that out of this war will come a value to this country many times the cost to us in dollars.

Too much complacency

One of our mistakes at the moment is that of a tremendous amount of self-complacency and self-satisfaction. We feel that because we mobilized so quickly and so magnificently for the prosecution of the war and because the country did the impossible in the matter of war production, that the job is done.

This attitude is dangerous in the extreme because mobilization for war is definitely in our national tradition, whereas the more tedious and less glamorous mobilization for peace is not. We must thoroughly realize that the real test of the nation's strength is her ability to mobilize for peace and to meet the manifold problems of a peacetime readjustment. Unless our present attitude is checked, it may again lead to war weariness and another homefront demand for an armistice before the job is done, inviting another war in another twenty years.

A new type of training

I want to take my own regiment as an example of the type of men we are going to have to deal with when this war is over. This regiment was in the first group of engineering regiments activated from civil life, and was the first of two special-service regiments. As you all probably know, the special-service regiment varies from the general-service regiment in that it is organized to administer, direct and superintend work where native labor is available.

I think the group that was brought together at Camp Claibourne was about as representative as any group of 1,400 young men could be. It included men from every state in the union and from all walks of life. While it is true that an effort had been made to select those who had had some connection with construction, or some phase of work which would make them adaptable to construction, including mining activities, nevertheless they did and do represent, I believe, an excellent cross section of American young manhood. And I think that this regiment today is representative and typical, notwithstanding the fact that training procedure now has been very much improved over that to which this first regiment was subjected.

These men came in green, unenthusiastic and skeptical, but inside of weeks (and weeks only) there emerged a thoroughly well-integrated military unit of which every man was proud. Their transition from green boys to soldiers was one of the most remarkable experiences I have ever known.

Through five months of training those men had not only the normal combat engineering training, but insofar as possible, training on special engineering, reconnaissance and demolition problems such as they might meet overseas.

Jobs tackled with enthusiasm

They landed in the Persian Gulf as the first contingent of construction troops to arrive there. They landed in the rainy season, finding conditions generally about as unattractive as you can imagine. They sang their way as they marched from the dock into tents pitched in mud ankle deep; and although the rain continued every day, the next day and the next day you could see the change, and inside of two or three days were clean company streets, and that whole area was drained and lighted and was sanitary, kitchen facilities had been installed and those fellows were ready to go to work. They tackled a road that had to be built through a desert of silt, a soil material that was until comparatively recent historical times a part of the bed of the Persian Gulf. They tackled that job, including the job of building a new port at Khorramshar, a job of building with inadequate facilities, inadequate and improper materials with a spirit such as I have never seen. This despite the fact that for the first two weeks their food was inadequate because our rations had not arrived and we lived on British rations.

We had a target for the opening of that road which on any analysis ap-

peared impossible. It didn't take an engineer or a construction man or contractor to look at that situation and that mud and that rain to say "That target is impossible," but it was accomplished. I had a job of no mean proportion in trying to keep these men, down to the last private, from working themselves to the point where they couldn't do their job. I don't remember of any case where I ever had the job or responsibility of asking men to speed up, but I do remember many cases of finding men who hadn't changed their clothes or left the job for 36 hours. They had a target set and each one of them took it as his own personal responsibility to see that that target was met, and it was met. Trucks rolled over that road on the date originally set regardless of weather.

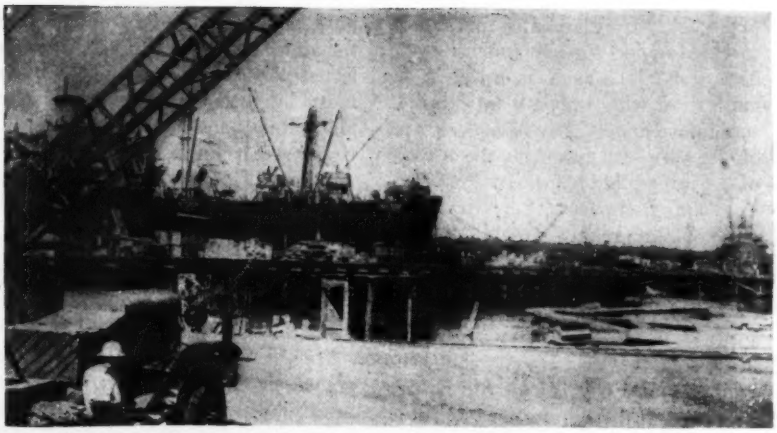
A different approach

Herein, I think, lies the big essential difference between the military man of this war and of my generation in the last war. The youth of the last war went into it enthusiastically and cock-sure, and met disallusionment at every turn, primarily with his early realization that the country was entirely unprepared for war with the consequent penalty that the square peg was usually placed in the round hole, there being no adequate machinery for personnel selection to evaluate or take advantage of civilian experience, special aptitudes and training. His military training, based as it was on out-of-date principles and a type of trench warfare where individual initiative was discouraged, provided an experience and training directly opposed to the demands of civil life.

As a result of this experience, in many, many cases, when these men returned to civil life, industry could not afford the cost, loss of efficiency and risks of readjustments necessary to reinstall the veteran in his old job.

There was no impatient enthusiasm on the part of the American youth to enter this war, but an intense seriousness and a general conviction that we and our generation, not they, were responsible for the present situation, in that we had only done a half job and while winning the war had definitely lost the peace.

When this generation was drawn into the war they found the services ready to receive and train them, so that after only weeks of training we could barely recognize our own sons. Their enthusiasm and pride of membership in the armed forces grew with their realization of their newly found and newly developed power and initiative. There is no question in my mind but that we have the finest trained army and the best training procedure of any army in the world. Certainly, in no other army do you find an equal pride and attitude of self-assurance.



Facilities for transshipping supplies on the Persian Gulf were built by engineer regiments of the U. S. Army under almost unbelievably bad climatic conditions.

Initiative stimulated

Of most importance is the basic difference that for this war each man is taught self-reliance and self-discipline, and his initiative and ability for independent action are developed to the highest obtainable degree; because in this war nothing is static, battles are frequently won by quick action and initiative, and important tasks often fall to small groups.

When we left for overseas we comprised a regiment of thoroughly trained experts and specialists, and when we arrived we put through a difficult construction program. Complex engineering and construction equipment was being efficiently operated, maintained and repaired; complete machine shops were being operated; large groups of native labor were being directed and all of the military duties were directed and integrated—in many, many cases by men who a few months before had been in entirely different or far less skilled occupations. In civil life, under our apprentice system, such results would have required years instead of weeks and months, and many would never have had the opportunity to receive this splendid training.

Senator Russell in his report to the Senate on his war area inspection says that one of the benefits of this war will lie in the training of large groups of the finest craftsmen and mechanics in the world. "Boys who twelve months ago were either unemployed or were doing work requiring no skill are today repairing the most delicate instruments, such as radar and radio equipment, telephone exchanges, submarine periscopes, and are working with the countless finely balanced machines which are necessary in the operation of airplanes, submarines and other complicated mechanisms of war." These men and women will come back to civil life better trained and more efficient than many of the artisans and mechanics now doing similar civilian work. And so in every branch of the Army, Navy and Marine Corps, men by the millions will return, especially skilled for civilian occupations, trained on a basis of efficiency, teamwork and speed never before dreamed of, eager for and demanding their places in the reconstruction of the postwar world.

What I am trying to say is simply this: Out of this war are going to return men who can do their job better than comparable men in the same job back home, as opposed to the last war situation where they came back ill equipped for any job.

A challenge for those at home

I conscientiously believe that these men as a group are coming back on a basis that is going to put to the best test those of us who have stayed behind.

I have seen and known in my own

experience, army artisans, mechanics, foremen and superintendents who have done jobs such as no civil organization with which I am familiar could have done. They have been part of and have seen every day the miracle of the impossible being accomplished. They have witnessed the miracle of our supplies, munitions and requirements being always in the right place at the right time. My group were halfway around the world but the supplies and the logistics back of our forces illustrated the magnificent job done every day by our forces during this war. So that those boys have got used to the impossible. They have become accustomed and inured to the miraculous and they are ready to step in and do the impossible for postwar economy when they get back.

Ready for better jobs

Therefore these boys shouldn't be expected to step back into the jobs that they left or to start at the bottom rung of industry, engineering or construction, if they are among the millions who have never had jobs, but have come out of school. I say this, not so much because it would be unfair to those boys (I think that is secondary), but because it will be unfair and stupidly blind of American industry to waste the potential wealth which our forces are going to present to us for employment, further development and further training.

In addition to the training that these men have had in specialists' schools and in actual operation in the field of combat, we will have those thousands who will have had special college training in the various courses that have been open to them throughout the country.

When I returned from several trips to Russia between 1929 and 1935 and talked on several occasions to such groups as this, many of my friends thought that I was at least turning slightly pink because I was enthusiastic about some of the things that Russia was doing, especially about what she was doing in the field of education, and because I predicted in 1930 that if the test ever did come to Russia she would be unbeatable, primarily because she had recognized the fact that we until now have not recognized, namely, that a nation's number one natural resource is developed brainpower. Russia then was devloping her brainpower starting from scratch out of a compulsory educational system for all up to 16 years of age, which selected those best qualified for and most interested in further development. Russia has consistently been developing her finest brains, frequently and usually from the most unlikely sources.

Our number one resource

We are discovering now as a result of this war, I hope, that developed brainpower is our number one resource. We are seeing that same phenomenon that Russia saw of fine brains, fine minds coming from the most unlikely, unpromising backgrounds. I have seen in my own regiment, the emergence of our most able leaders out of our training programs or specialist schools where an analysis of their background or educational equipment would not show anything like the capacity and capabilities developed. I hope and I pray that we will take advantage of this opportunity to continue on a selected basis the vocational training, the trade training and the education of these men and women as they return. If we don't, if we let this opportunity become a political football, it is the fault of such groups as ours here tonight and not, as we are so prone to say, government; because if any group should know, we should know that government is us. Government will do what we demand and go where we lead; and if we don't take the leadership in the further development, education and training of these men it is our own fault and we will have lost the greatest opportunity that any country has ever had.

So I say that we should plan now for these men.

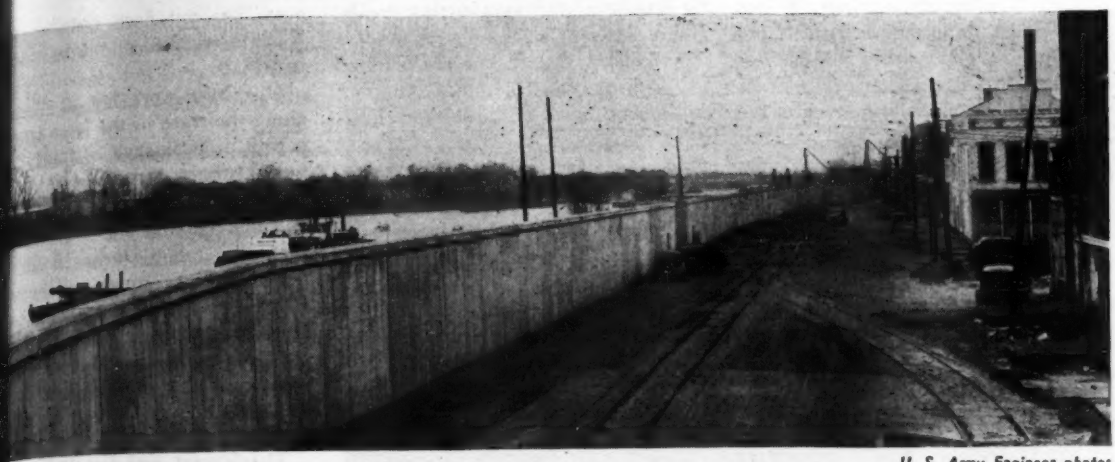
I would like to add just one other thought: That we should get ourselves into step with these men, with their thinking along so many lines in which I think we are at odds today. For example, the prevalent attitude of looking for and hoping for, even predicting, an early armistice. I didn't run into any man overseas who wanted an early armistice. I didn't run into any of the fellows who didn't feel that if we don't finish the job this time we may never get another chance to. I have two sons and a son-in-law in it, and I don't think they hope this thing will be over in 60 or 90 days because they are convinced if it is, we will have to do it all over again in another twenty years. I am entirely convinced that unless we finish the job this time for good and for all it is our fault and we won't deserve any better fate than to find ourselves in it again when the odds are much more strongly against us. I don't believe that the men as a whole in uniform want to see this thing over until it is conclusively over.

Industry's obligation

Now just what is American business and American industry going to do in preparation for the return of our several million fighting men and women? Does American business and industry expect that a World War I philosophy and a Versailles Treaty intellect will be adequate and effective in providing a leadship acceptable to these new veterans? This is our most pressing question because if the answer is "Yes," be prepared for a coalescence of these millions of men and women into the most powerful pressure group this country has ever known, one which will justifiably demand the integration of the veteran into the machinery and leadership of our entire postwar economy. Apple-selling veterans after this war will mean a national tragedy which will shake the very foundations of our competitive industrial system.

On the other hand, if American business will look forward to the return of our veterans as an unprecedented opportunity for a partnership to provide the moral, spiritual and scientific leadership in world organization and cooperation and in the development of new industries, and if we are fully awake to the part that partnership must play if civilization and American leadership are to survive and flourish, then and only then will we be keeping our appointment with destiny and our obligations to those who will not return.

The time may be all too short. The job and its responsibilities are clear in that each of us should throw his continuing effort and influence toward the education of our profession, of industry and of our government toward a recognition of our unprecedented and never-again-to-be-equalled opportunities and obligations to fully utilize and to complete the training and education of this war-created source of national power and wealth. In other words, the reemployment of the returning veteran is a God-given opportunity as well as a national obligation.



U. S. Army Engineer photos

. 1. Requiring a minimum of right-of-way, this large cantilever retaining wall protects the city from future floods.

Work on Flood Protection Structures Nears Completion at Paducah, Ky.

***ntents in Brief**—Levees and flood walls to protect Paducah, Ky., from ods such as inundated most of the city in 1937 are nearing completion. mping plants to discharge rain water from the leveed area are being built, t installation of pumps is being delayed due to war restrictions.*

HEN THE OHIO RIVER went on a mpage in January, 1937, inundating percent of Paducah, Ky. to a pth of from 6 to 10 ft. it clearly monstrated that city's vital need r adequate flood protection. En- ling federal legislation was enacted thin the year and the Corps of Engi- ers, U. S. Army, embarked on a nstruction program designed to otect Paducah from all future ods. The program includes earth ees and concrete retaining walls ong three sides of the city to protect ,970 acres of valuable municipal d suburban property.

Earth levees and concrete walls

The entire levee system is nearly mi. long. It includes some 45,000 . ft. of earth-fill levee in the outly- g districts and 16,000 lin. ft. of con- ete retaining wall along the river ont where right-of-way was ex- emely limited. The last stretch of is wall was completed recently.

There are, in general, three types retaining walls used: A reinforced ncrete cantilever T-section for heights up to 22 ft.; a reinforced concrete L-section adjacent to existing buildings; and an I-section wall where extremely limited working areas prevented the construction of wall footings.

The I-section wall was limited to a height of 12 ft. above ground. It is a composite structure of interlocking steel sheetpiling driven 20 ft. below ground and encased in a 2-ft. thick reinforced concrete wall. Walls were

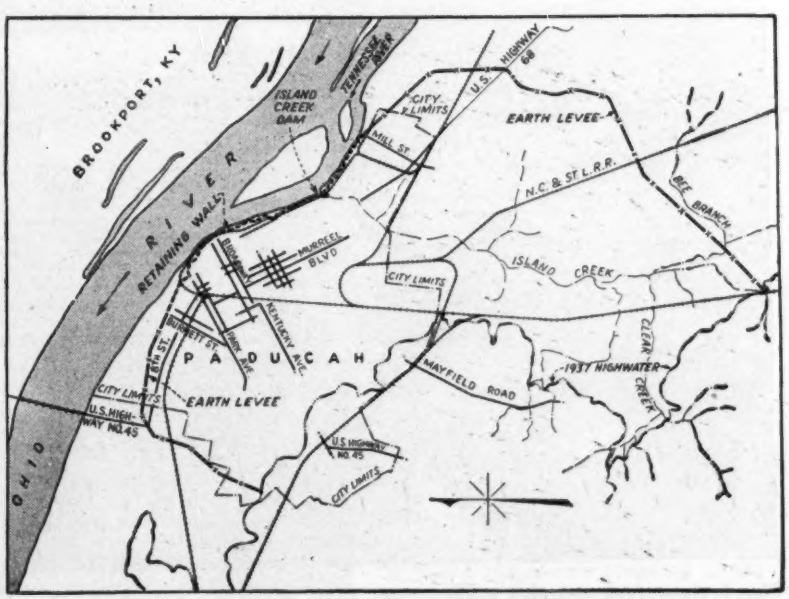


Fig. 2. Earth levees and concrete walls enclose the city on three sides to prevent a repetition of the 1937 flood.

poured in alternate sections. Forms were lined with masonite on sheathing inside of 2 x 6-in. walers held rigidly in place by vertical steel beam studs.

Twelve pumping stations will serve the levee-enclosed area during floods. Seven have been completed, one is now underway, and four are planned for future construction. Pumping equipment for all of the stations, however, has not been installed due WPB restrictions on the use of criti materials.

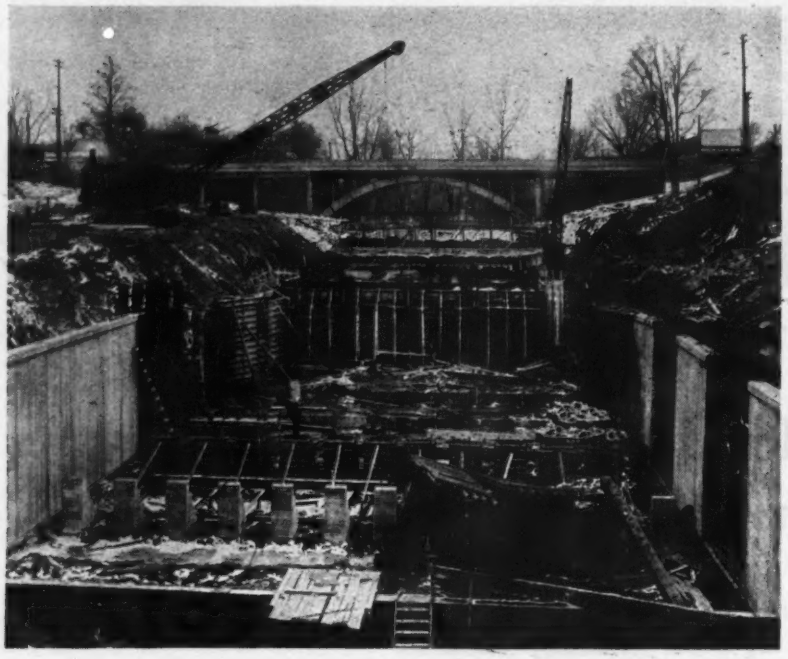


Fig. 3. Dentated concrete sills and 22-ft. cantilever retaining walls form the stilling basin at the discharge end of the Island Creek pumping plant. The arch bridge in the background limited construction operations.

Fig. 4. Reinforced concrete conduits will carry the water from Island Creek through the dam being built across that stream channel to keep backwater from the river out of the city.

Openings were left at 42 po along the trace of the levee system permit free passage of traffic dur normal times. Railroads pass thro 11 of these, 12 are for industrial and the remainder are for street highway traffic. During flood em gencies, all openings will be clo water-tight with portable steel aluminum frames, supporting ho zontal I-beam purlins faced with terlocking aluminum sheeting.

Island Creek plant

The largest and last link of th protective works, now under c struction, is the Island Creek barr dam and pumping plant, which cost $500,000. It was 60 percent co plete on March 1 when floods in Ohio shut the work down for seve weeks.

Island Creek passes through protecting levee south of Paducah, flows through the city and empt into the Ohio just below the mo of the Tennessee River. An earth barrier dam 420 ft. long and 60 high is being built across the creek form the closing unit in the prot tive levee along the north side of city, adjacent to the river. It will ha a top width of 20 ft., side slopes o on 2½ for the top 30 ft. and 1 3 over the remainder. The pump plant is being built right in Isla Creek as a part of the barrier da

Under normal conditions, Isla Creek will continue its natural fl through the city and out through large multiple box culvert beneath t pumping plant. During severe floo however, sluice gates at the culv outlet will be closed, the creek chann will be blocked where it ente through the south levee, and all su sequent rainfall within the levee sy tem will be pumped out into the Oh River. Due to the natural stora capacity of the creek, pumping w not be necessary until the runoff e ceeds 6.3 in. over the entire 10,9 acres enclosed by the levee system.

Limited plant site

In designing the pumping plant, t Army Engineers were limited to short length of creek channel for t construction site. The barrier dam close to the river, leaving only su cient space for a stilling basin at t

t end of the discharge culverts. A
rete arch bridge on Meyers Street,
ort distance upstream, left very
extra room for constructing the
structure.

e stilling basin is reinforced
rete, 100 ft. long by 70 ft. wide,
22-ft. high cantilevered training
and a series of concrete den-
sills to serve as baffles for the
harged water.

nstruction operations also were
icted to a limited area. A steel
pile box cofferdam across Island
k just below the stilling basin
back the normal river water. The
was dammed a short ways up-
m, and diverted around the con-
tion site through an open chan-
Excavation was by dragline, with
nel side slopes as steep as pos-
. All excavated material was
ed at a considerable distance
the construction site.

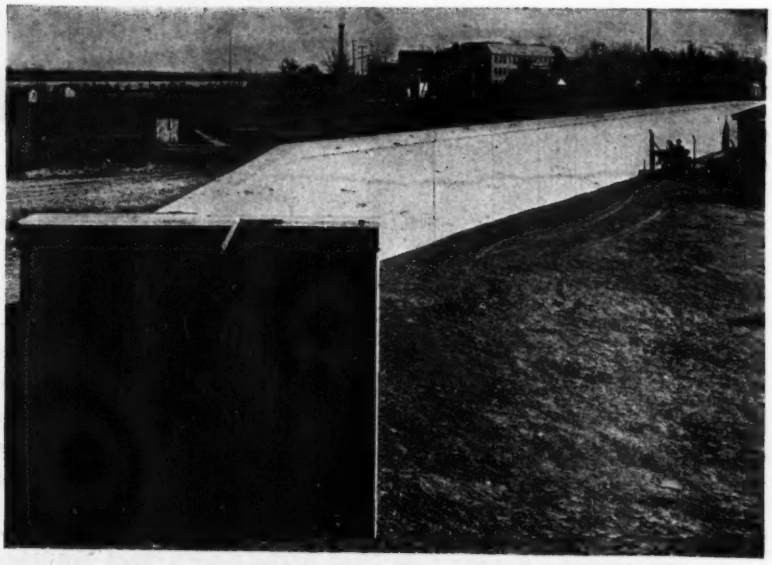


Fig. 5. Provisions were made to install portable watertight steel flood barriers at all openings in the flood wall.

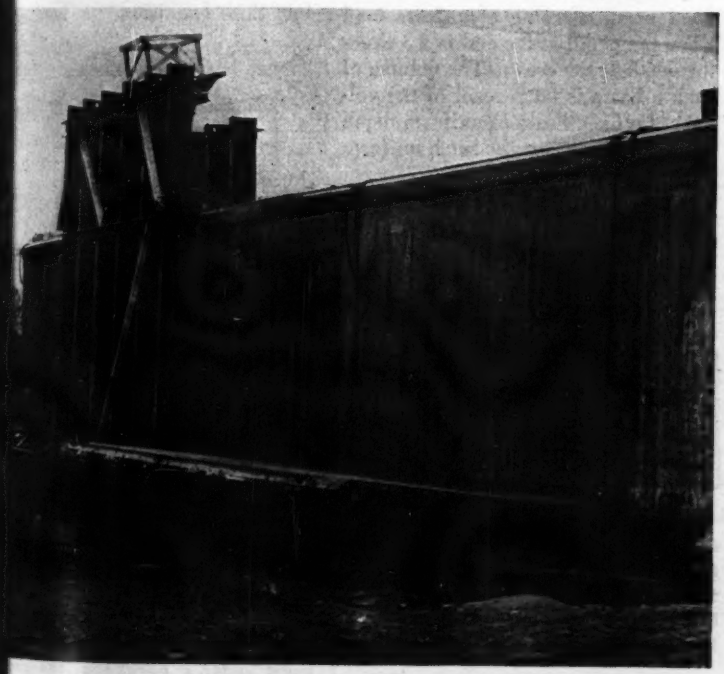
Articulated concrete culvert

4-span rigid frame concrete box
rt 240 ft. long, with 10 x 10-ft.
ings, connects the inlet structure
the stilling basin. It lies in the
bed directly beneath the pump-
plant. The enormous concrete
age in this culvert necessitated its
poured in sections not over 20
ng. It was built, however, as an articulated structure, with special keyed joints formed between sections to insure straight alignment of culvert barrels and to prevent unequal settlement. Electrically operated 10 x 10-ft. sluice gates bear against the outlet end of the culvert.

Present plans call for the installation of a mixed-flow pump of 33,000-g.p.m. capacity above each of three of the culvert barrels. An additional pump will be installed over the fourth barrel should it become necessary to increase the plant's capacity. Pumps will hang in 13 ft. 3 in. by 12½-ft. rectangular wells.

Pump impellers will force the water through openings in the riverward wall of the plant and into discharge chambers connected with the culvert barrels. Each pump will be operated by a 300-hp. electric squirrel-cage induction motor, connected direct to the pump shaft.

Motors will not be automatic since Island Creek furnishes such a large amount of natural storage that there will be plenty of time to start the pumps during floods. Electrical current for the Island Creek facilities is 60 cycle, 3-phase, 440-v.



6. Wall sections were poured in alternate sections to speed the work. Steel- studs insured correct alignment.

Engineering personnel

A contract for the Island Creek barrier dam and pumping station is held by the Lake States Engineering Co., Chicago. Irwin H. Baker is superintendent of construction.

The work is being done by the Corps of Engineers under the direct supervision of Lt. Col. J. H. Veal, district engineer, Louisville, Ky. and under Col. C. L. Hall, division engineer, Ohio River Division.

Plans for the barrier dam and pumping plant were prepared in the office of the district engineer at Louisville. Ford Dyer is resident engineer on construction.

Simplified Concrete Rigid Frame Design

Julian C. Spotts
Superintendent, Jefferson National Expansion Memorial,
National Park Service, St. Louis, Mo.

***Contents in Brief**—Rigid frame concrete bridges with curved soffit decks are designed quickly and with minimum computations by first assuming relative proportions of the frame dimensions, completing the detailed analysis, and finally assigning true numerical values to the span, height and crown thickness. This simplified procedure is well illustrated by a practical example of highway bridge design.*

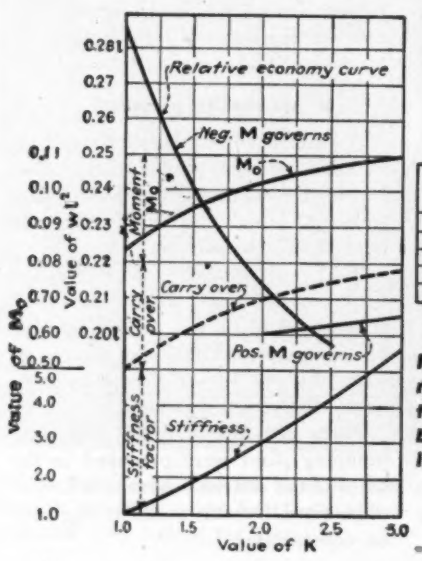
MANY STRUCTURAL DESIGNS are achieved through the method of trial and error. This is particularly true for concrete rigid frames. It therefore is desirable to evolve a method of design that will consume a minimum of time and computations, and arrive as directly as possible at the final shape and dimensions of the structure. The following data and figures are believed to offer a simplified method for the rapid and accurate design of rigid frame concrete bridges with curved soffit decks.

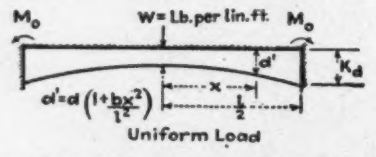
All elements of fixed beams necessary for the proper moment distribution are shown in Figs. 1 to 4 inclusive, when such beams form component parts of a rigid frame. The beam in Fig. 1 has a curved soffit in the shape of a parabola and its elements are recorded for a fixed end depth varying from one to three times the depth at the crown or center line. All elements were computed by integration, assuming the beam to be homogeneous throughout. The relative economy curve was computed by taking the square root of the negative or positive moment (whichever governed) as representative of the depth of the beam and with these relative depths the vertical surface area of the beam was determined.

It should be noted that maximum economy in materials is attained in a fixed beam carrying a uniform load when the depth at the end is 2.3 times the depth at the crown. The volume of such a beam is 68 percent of the volume of a fixed beam of uniform depth designed to support the same uniform load. Since the deck of a rigid fr is restrained somewhat less than der truly fixed conditions the nega moment will be less and the posi moment greater than in a fixed be Analyses of numerous frames indi that a ratio of end depth to cr depth of the deck ranging between and 2 generally will afford the m mum economy in materials. Aes ic proportions, however, may de mine this ratio rather than econo

Negative moments, computed integration, for fixed beams curved soffit supporting a para load are shown in Fig. 2. This gr provides directly the negative ments due to the dead load of curved portion of the beam below soffit at the crown.

In Fig. 3, the elements of the s beam supporting a concentrated l are recorded. It is worth noting for this condition of loading





K	Moment M_o	Stiffness factor	Carry over factor	b
1.0	0.0833	1.000	0.5000	0
1.5	0.0955	1.906	0.6185	2
2.0	0.1025	3.006	0.6945	4
2.5	0.1069	4.277	0.7465	6
3.0	0.1099	5.701	0.7840	8

Axis of beam assumed straight

Fig. 1. Coefficients for fixed-end moments, relative stiffness and carry-over factors for parabolically shaped fixed beams are calculated as the first steps in design.

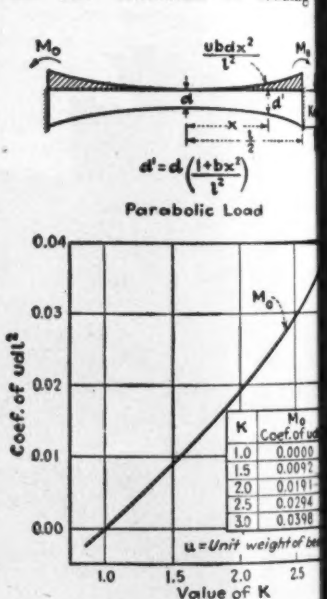
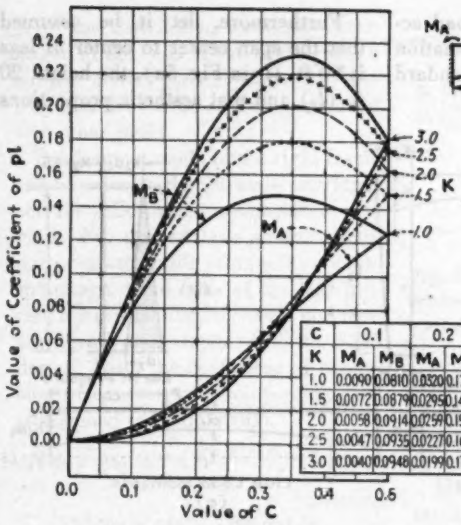


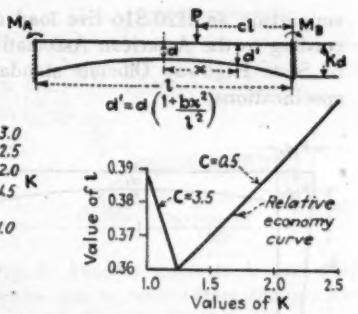
Fig. 2. Moment coefficients for a beam under a parabolic load give negative moments due to the load of the curved portion.

ximum economy in materials is ined when the fixed end is 1.25 es the depth at the crown and that materials required are approxiely 93 percent of those for a fixed m of uniform depth carrying the e concentrated load. The elements fixed beams subjected to the loads erally resisted by the legs of a id frame are indicated in Fig. 4.

At this stage in the preliminary de- n of a rigid frame the usual prac- is to estimate the frame dimen- s by assigning finite values to all ical points. Then, following a de- d analysis, the frame dimensions corrected and the detailed analysis eated. This succession of trial and or is continued until the estimated ensions are proven adequate.

Realizing the vast amount of work n encountered in such a trial and or method of design, it is proposed e, not to assign finite values to the me in the first instance, but to ume the relative proportions of frame in terms of the span, height, l crown thickness then to proceed h the detailed analysis, substituting the last step assigned numerical ues to the span, height and crown.



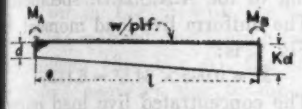


C	0.1		0.2		0.3		0.35		0.4		0.5	
K	M_A	M_B	M_A	M_B	M_A	M_B	M_A	M_B	M_A	M_B	M_A	M_B
1.0	0.0090	0.0810	0.0320	0.1280	0.0630	0.1470	0.0796	0.1479	0.0960	0.1440	0.1250	0.1250
1.5	0.0072	0.0879	0.0295	0.1479	0.0649	0.1771	0.0861	0.1798	0.1081	0.1755	0.1490	0.1490
2.0	0.0058	0.0914	0.0259	0.1599	0.0625	0.1970	0.0865	0.2017	0.1127	0.1971	0.1639	0.1639
2.5	0.0047	0.0935	0.0227	0.1677	0.0589	0.2114	0.0844	0.2181	0.1137	0.2135	0.1741	0.1741
3.0	0.0040	0.0948	0.0199	0.1732	0.0548	0.2225	0.0814	0.2308	0.1131	0.2264	0.1816	0.1816

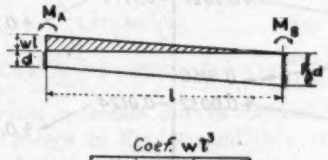
Fig. 3. Negative moments are computed for a moving concentrated load on parabolic beams having varying values of K.

If the crown thickness has been misjudged in this preliminary analysis, only one operation at the end is necessary to make the correction, thereby saving full detailed repeated analyses.

To illustrate the ease with which rigid frames can be designed, a typical frame has been chosen as indicated in Fig. 5a. It is assumed that the designer has some experience in proportioning frames or else is in possession of empirical rules from which reasonable proportions can be determined. Assume it is desired to design a highway structure requiring certain clearances of span and height, and

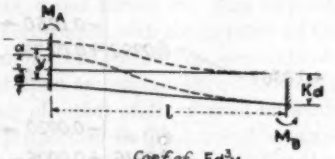


Moment		Stiffness		Carry Over	
M_A	M_B	S_A	S_B	C_A	C_B
0.0833	0.0833	1.000	1.000	0.5000	0.5000
0.0645	0.1049	1.365	2.509	0.6758	0.3677
0.0529	0.1216	1.716	4.863	0.8343	0.2943
0.0450	0.1352	2.057	8.171	0.9811	0.2470
0.0392	0.1466	2.393	12.534	1.1192	0.2137



Coef. wl^3

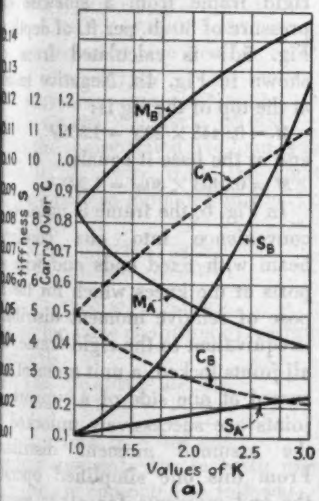
K	M_A	M_B
1.0	0.0500	0.0333
1.5	0.0403	0.0445
2.0	0.0339	0.0536
2.5	0.0294	0.0613
3.0	0.0260	0.0680

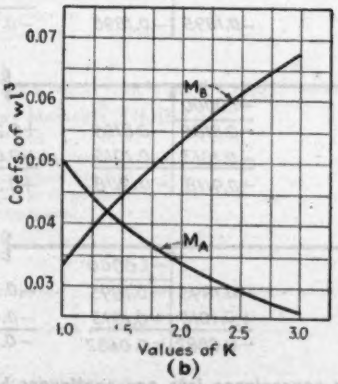


Coef of $\frac{Ed^3y}{12l^2}$

K	M_A	M_B
1.0	6.0000	6.0000
1.5	9.1490	13.7235
2.0	12.5879	25.1757
2.5	16.3030	40.7574
3.0	20.2814	60.8443

Per ft. width of beam
E = lb. per sq. ft.
d = ft.
y = ft.
l = ft.
M = ft.lb.





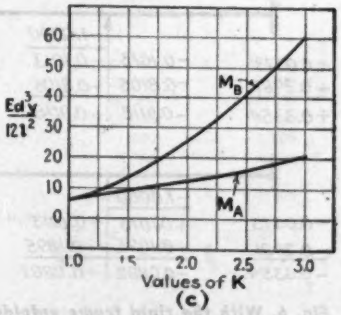


Fig. 4. Elements of fixed beams acting as the legs of a rigid frame are computed for uniform side pressure (a), triangular earth pressure (b) and for unbalanced sidesway shown in (c).

supporting an H20-S16 live load according to the American Association of State Highway Officials standard specifications.

Furthermore, let it be assumed that the span center to center of legs is 60 ft. (l_1 in Fig. 5a), the height 20 ft. (l_2) and that aesthetic proportions

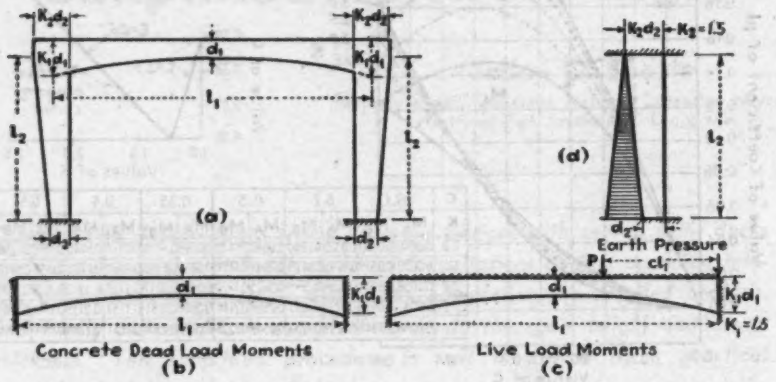


Fig. 5. A typical concrete rigid frame highway bridge (a) is subjected to bending moments from the concrete dead load (b), uniform and concentrated live loads (c) and sidewise earth pressure (d).

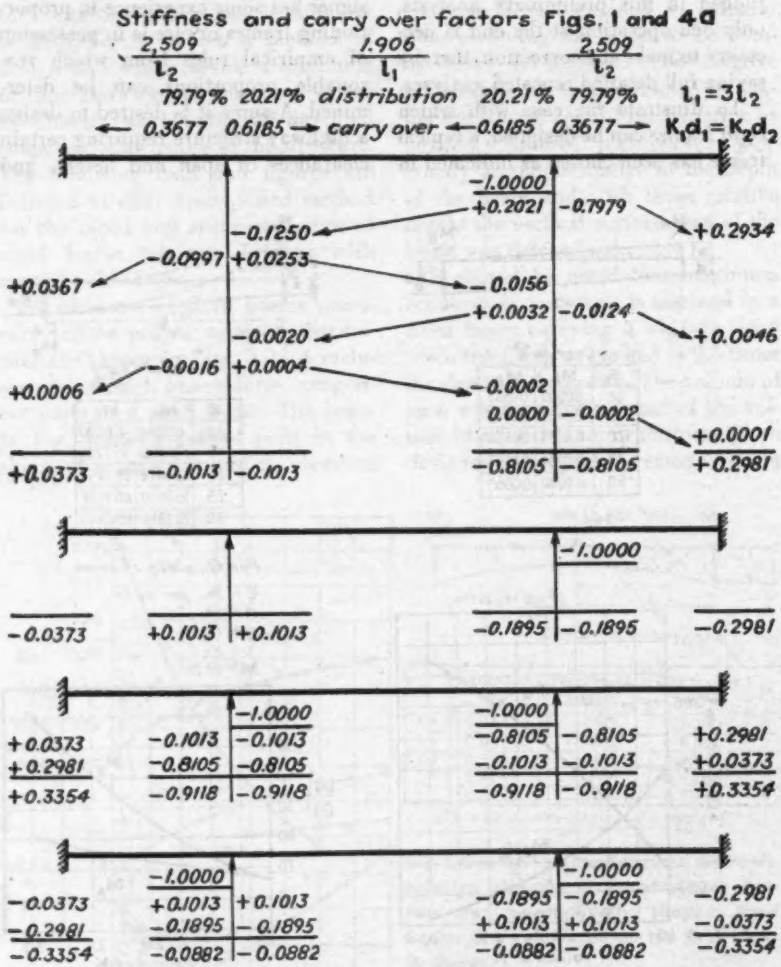


Fig. 6. With the rigid frame unfolded for convenience into one continuous beam, fixed at the ends and supported at the knees, moment distribution is equivalent to that of the original frame.

require the deck thickness at the center line of support, $k_1 d_1$ to be 1½ times the thickness d_1 at the crown. For the particular hypothetical case $k_2 d_2$ is assumed equal to $k_1 d_1$ and the legs of the legs are considered fixed. With these relative proportions established all moments in the structure can be found in terms of l_1, l_2 and d_1.

First step in the design is to compute the fixed end moments of the several component parts of the frame indicated in Fig. 5, with reference to the elements of fixed beams in Figs. 1 to 4. Referring to Fig. 5b and assuming concrete weighs 150 lb. per cu. ft., the negative moment from Fig. 1 for the 1-ft. width of beam under its uniform dead load is:

$$M = 0.0955 \times 150\, d_1 l_1^2 = 14.325\, d_1 l_1^2$$

and likewise the moment of the parabolic dead load weight of concrete from Fig. 2:

$$M = 0.0092 \times 150\, d_1 l_1^2 = 1.380\, d_1 l_1^2$$

Thus, the total dead load moment equals $15.705\, d_1 l_1^2$.

The negative moments from live loads as indicated in Fig. 5c are based on a uniform load of 64 lb. per lin. ft. and a concentrated load of 3,200 lb. in accordance with the H20-S-16 loading of the A.A.S.H.O. specifications. The uniform live load moment, from Fig. 1, is:

$$M = 0.095 \times 64\, l_1^2 = 6.112 l_1^2$$

The concentrated live load moments from Fig. 3 are:

When C = 0.5, $M = 0.1490 \times 3{,}200 l_1 = 476.800 l_1$

When C = 0.35, $M_B = 0.1798 \times 3{,}200 l_1 = 575.360 l_1$ and

$$M_A = 0.0861 \times 3{,}200 l_1 = 275.520 l_1$$

Bending moments in the legs of the rigid frame from a sidewise earth pressure of 30 lb. per ft. of depth (Fig. 5d) is calculated from data shown in Fig. 4b. Negative moment at the top of the leg is:

$$M = 0.0445 \times 30 l_2^3 = 1.335 l_2^3$$

and at the base it equals:

$$M = 0.0403 \times 30 l_2^3 = 1.209 l_2^3$$

In Fig. 6, the frame is unfolded for convenience into one continuous beam with fixed ends and with supports at the knees which for the purpose of relative moment distribution is equivalent to the rigid frame. With all joints locked, a unit moment is assumed at one side of a support. Then joints are successively unlocked and the assumed moment distributed. From this one simplified operation the end moments for other assumed conditions may be distributed directly as indicated.

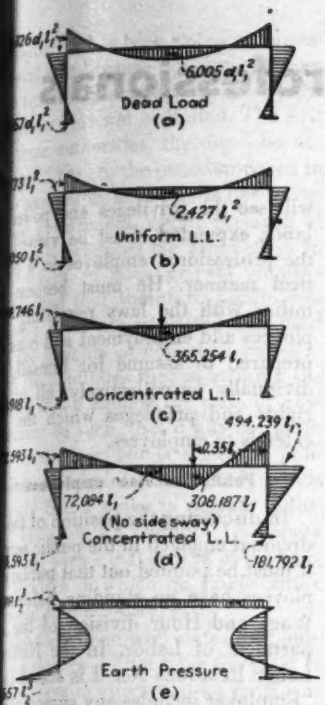


Fig. 7. Distributed moments resulting from various kinds of loads.

By combining the moment values for the different conditions of loading shown in Fig. 5 with the corresponding moment distribution for a unit moment (See Fig. 6), the final distributed moments due to the external loads shown in Fig. 7 are completed with all values remaining in terms of l_1, l_2 and d_1. Dead load moments (a) are:

$M_a = 15.705\ d_1 l_1^2 \times 0.9118 = 14.326\ d_1 l_1^2$

$M_b = 15.705\ d_1 l_1^2 \times 0.3354 = 5.267\ d_1 l_1^2$

and for uniform live load (b):

$M_a = 6.112 l_1^2 \times 0.9118 = 5.573 l_1^2$

$M_b = 6.112 l_1^2 \times 0.3354 = 2.050 l_1^2$

For concentrated live load at center line of frame (c):

$M_a = 476.800 l_1 \times 0.9118 = 434.746 l_1$

$M_b = 476.800 l_1 \times 0.3354 = 159.918 l_1$

When the concentrated live load is located $0.35 l_1$ away from the right-hand support as indicated in Fig. 7d, M_a equals:

$375.360 l_1 \times 0.1013 = 58.284 l_1$

$275.520 l_1 \times 0.8105 = 223.309 l_1$

Total $M_a = 281.593 l_1$

and for the same condition of loading, M_b equals:

$375.360 l_1 \times 0.8105 = 466.329 l_1$

$275.520 l_1 \times 0.1013 = 27.910 l_1$

Total $M_b = 494.239 l_1$

Bending moments due to earth pressure (e) are computed as follows:

$M_a = 1.335 l_2^2 \times 0.0882 = 0.118 l_2^2$

$M_b = (1.335 l_2^2 \times 0.3354) + 1.209 l_2^2 = 1.657 l_2^2$

With the distributed moments determined at the ends of the beams, it is a simple matter to calculate the moments at the center of the beams or at any other point.

Bending moments in the rigid frame can be calculated accurately providing certain allowable assumptions are made. For this analysis assume methods of construction eliminate concrete shrinkage, fixed ends of the legs prevent horizontal displacement, and temperature varies from +35 to −35 deg. F. Also, the coefficient of expansion of concrete and reinforcing steel is assumed to be 0.000006.

Then Y (Fig. 4c) $= \dfrac{\pm 0.000006\ l_1 \times 35}{2} = \pm 0.000105 l_1$

$$M_a = \frac{9.1490 \times 144 \times 3{,}000{,}000\ d_2^3}{12 l_2^2} \times 0.000105\ l_1 = \frac{34{,}583.22\ d_2^3\ l_1}{l_2^2}$$

.....from Figs. 4c and 5a

$$M_b = \frac{13.7235 \times 144 \times 3{,}000{,}000\ d_2^3}{12 l_2^2} \times 0.000105\ l_1 = 51{,}874.83 \frac{d_2^3\ l_1}{l_2^2}$$

M_b distributed, becomes:

$$51{,}874.83 \frac{d_2^3\ l_1}{l_2^2} \times 0.0882 = 4{,}575.36 \frac{d_2^3\ l_1}{l_2^2} \quad \text{.....Fig. 6}$$

$$51{,}874.83 \frac{d_2^3\ l_1}{l_2^2} \times 0.3354 = 17{,}398.82 \frac{d_2 3\ l_1}{l_1^3}$$

Final moments due to expansion are shown in Fig. 8a and they are equal, but of opposite sign, to moments caused by contraction of concrete indicated in Fig. 8b. Values of M_a and M_b will be in ft. lb. providing values of l_1, l_2 and d_2 are shown in feet.

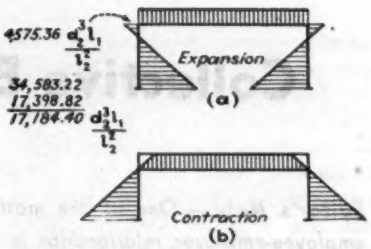


Fig. 8. Bending moments in the rigid frame due to temperature changes are calculated by simplified formulas.

Having all of the foregoing external bending moments calculated in terms of span, height and depth of the curved concrete deck, final moments can be ascertained (see table below) by substituting numerical values for l_1 and l_2 and the assumed values for d_1 and d_2. By way of repetition, it should be noted that in case the assumed depth has been misjudged, the only corrections necessary are in the dead load and temperature moments.

Beyond this stage of the design, corrections for deck curvature, sidesway, direct thrust, etc. may be made in accordance with the practice of the designer. It should be remembered that upon ascertaining the critical sections all other sections must be made in proportion to the original assumptions, otherwise the moment distributions may be in error.

FINAL MOMENTS AND CONCRETE DESIGN

From Figs. 7 and 8: Bending Moments

	Negative	Positive
Dead load	$14.326\ d_1 l_1^2$	$6.005\ d_1 l_1^2$
Uniform live load	$5.573\ l_1^2$	$2.427\ l_1^2$
Concentrated live load	$494.239\ l_1$	$365.254\ l_1$
Earth pressure	$0.118\ l_2^2$	$-0.118\ l_2^2$
Temperature	$\dfrac{4{,}575.36\ d_2^3 l_1}{l_2^2}$	$\dfrac{4{,}575.36\ d_2^3 l_1}{l_2^2}$

Assume $d_1 = 2.33$ ft.; $l_1 = 60$ ft.; $l_2 = 20$ ft. and $d_2 = 2.33$ ft.

Final Moments (ft.-lb.):

Dead load	120,000	50,000
Uniform live load	20,000	9,000
Concentrated live load	30,000	22,000
Impact at 30 percent	15,000	9,000
Earth pressure	1,000	−1,000
Temperature	9,000	9,000
Total	195,000	98,000

Assumptions: $f_c = 1{,}000$ psi.; $f_s = 20{,}000$ psi. and $f_c pj = 148.15$

Effective depth required	$\sqrt{\frac{195{,}000}{148.15}} = 37$ in.	$\sqrt{\frac{98{,}000}{148.15}} = 26$ in.
Add for steel coverage	2 "	2 "
Gross depth required	39 "	28 "
Gross depth used (Ratio 1.5 to 1)	42 "	28 "

Collective Bargaining for Professionals

***Editor's Note**—One of the most active participants in discussions on employee-employer relationships in the professional field is A. M. Rawn, chief engineer and general manager of the Los Angeles County Sanitation District, chairman of the A.S.C.E. committee on employment conditions. In a recent address before the American Water Works Association he analyzed the position of the professional worker, with particular emphasis on the problems of those who are engaged in the public service. The following statements have been extracted from Mr. Rawn's address.*

IN COMMON with many others I have felt some anxiety about the success with which the professional man, essentially an individualist, might breast the current of events alone or where he might wind up if he let others, strong and united, act for him. To a material extent the examination has also led in the direction of that individual known by the inclusive term "white collar" employee as well as toward the public employee. It takes a pretty broad picture of the whole background of employment to begin to comprehend why the professional and white collar employee more often than not has remained economically static, while those who work in the trades and crafts, as well as those who labor, forge ahead financially in a manner which leaves the brethren of the pencil, pen and slide-rule in a state of bewilderment and some envy.

A professional viewpoint

What is the position of the professional, the white collar and public employee in this great social transformation?

The professional employee desires above all things to have his professional status recognized as his strongest community of interest with his fellows. He desires that negotiations relating to his wages, hours of work and conditions of employment be made either between himself and his employer or between representatives of his own collective choosing and his employer; and that those who represent him share in his community of interest, understand his principles and ideals and, in effect, have the professional point of view. Individually and collectively he is opposed to having his bargaining rights assumed by non-professionals, and matters relating to his wages, hours and working conditions settled with his boss by them.

Professional men, particularly chemists and engineers, have had to call upon the resources of their technical organizations to prove that they were professionals and that as such they had a community of interest not common to non-professionals and were therefore entitled to be excluded from heterogeneous bargaining groups designed to include both those of professional and non-professional status.

Merely being able to stay out of the heterogeneous bargaining group is not enough to prevent the representatives thereof from assuming the bargaining rights of the professional employee in an office which has been organized; neither is it enough to permit him adequate representation with his employer upon wages, hours and working conditions. To fully protect himself from domination by non-professionals, he must not only insist that he be excluded from trades and labor organizations, but if necessary must be prepared to organize and bargain collectively in his own behalf.

A clear understanding of his rights and privileges under the law is a necessary prerequisite to any activity in this respect. The law does provide for him, and all of the advantages extended to any other employee are his if he desires to avail himself of them. The nature of his work and the inherent individualism which is so strong a characteristic of the professional man has many times restrained him from seeking such advantage as the law offers—at times to his great disadvantage.

The future, which in all probability will see the privileges and power labor expanded, must be viewed the professional employee in a pra tical manner. He must become f miliar with the laws regulating e ployees and employment and must prepared to assume for himself, i dividually or collectively, all of t rights and privileges which the l extends to employees.

Public service employees

In discussing the position of the i dividual engaged in the public servi it must be pointed out that public e ployees have no standing before t Wage and Hour division of the D partment of Labor. In the Nation Labor Relations Act it is stated th "Employer includes any person acti directly or indirectly in the interest an employer in relation to an e ployee, but shall not include t United States or any State or politic subdivision of a State . . ." An e ployee is defined as "any individu employed by an employer." Thus appears that while employees of t United States or a state or any poli cal subdivision thereof have the rig to organize and bargain collectivel their employer, not recognized as su by the National Labor Relations A is not bound by the law to barga with them. Further, it is apparent th the public employee has no recour to the Wages and Hours Act.

In effect, this means that public e ployees can join together for colle tive bargaining purposes and barga with their employer but they cann take a dispute for settlement befo the National Labor Relations Boa or the National War Labor Board. need hardly make the statement abo organizing because you are all w aware that literally thousands of pu lic employees in the United States a organized for collective bargainin purposes.

The right of public employees strike is an interesting speculati about which much has been writte Three well-qualified authorities ha answered the question "Have publ employees the right to strike?" h stating respectively "Yes," "No" a

Maybe." It has been stated as fundamental that because government does not function for private profit, public employees are not exploited. The first of these authorities, the one who answered "Yes" to the question posed in this paragraph, says this is not so because government, under pressure of economy, produces the same effect in low wages as does private employment, and that therefore public employees often are exploited and need all the benefits of collective bargaining. He continues that in striking the action is not against the state or government as such, that it has no political motivation, but is aimed at politicians or administrators and is thus exactly like a strike in private industry. He cites a Columbia University study of over 1,000 strikes in the public services in which no single action pointed to the contrary.

The individual who states that public employees do not have the right to strike, says in effect that no employee has the right to interfere with the orderly conduct of public affairs with out the people's consent, but that the right to do so should be regarded in the same terms as the privilege of suing the state granted to individuals by the people. Not until the people recognize by law the right of public employees to refuse to obey their superior officers under specified circumstances and strike against the actions of public officials, is there any right of public employees to strike.

The third writer says "Maybe"—and relates that denying the public employee the right to strike is based upon the theory that government, as custodian of final authority in the land, cannot permit those whom it hires to carry on its work, to challenge its authority. He continues that federal employees are not forbidden to strike and says that when the state denies its workers the right to strike merely because they are government employees, it defines common-labor disputes as attacks upon public authority and makes the use of drastic disciplines and armed force a method of handling otherwise simple industrial relations.

This writer continues, in effect, that free labor movement among the millions of public employees is their only effective check upon the greatly enhanced power which expanding governmental activity gives to public authority.

You may subscribe to any one of these views, or any other which best suits your own reasoning. I have cited them to illustrate to you that the country has not as yet found the answer to public employees' difficulties nor prescribed a rational employer-employee relation in such service. Public employees do organize and, upon occasion, they strike; but it is yet to be determined whether they have the legal right to do so.

Facts versus theories

My limited experience indicates to me that in order to judge of this whole affair with any reasonable degree of accuracy one must approach it with an entirely open mind and admit that he is confronted with facts and not theories. Collective bargaining as manifested by labor union activity is one of the strongest and most potent forces in this nation today, and in view of the experience which has been gained in the last two or three centuries, particularly in the intensified industrial era represented by this, the Twentieth Century, it is bound to be strong in any democratic form of government.

Concessions from a powerful group to a less powerful one are seldom if ever voluntary; and the recognition of labor by capital as an influential and, at times, controlling partner in industry, is no exception. Labor has forced capital into its present position, and democracy, operating as it does in this republic, appears to be bent upon protecting the privileges which labor has gained.

Looking ahead

If the curve of events which has marked the evolution of collective bargaining here during the past forty years is any indication of what is to take place in the future, one can look forward to the privileges of collective bargaining, and the help and encouragement to bargain collectively being extended to all employees in some form or another in the entire country not many years hence; and those who operate public enterprise may, within the next short time, feel the pressure of labor brought to bear upon their methods and practices with full legal sanction.

Whether you like it or not, those are things with which you are confronted. I earnestly recommend that you keep alert to the situation and that if you have not already done so, you organize in committee to keep yourselves fully and adequately informed of the trend of labor activity in the municipal and public service field, and at all times be entirely aware of the rights and privileges accorded to both employer and employees, and with respect to the latter include the professional and white collar employees as well as trades and crafts.

War-liberated Holland To Reclaim Flooded Land

After liberation Holland will have to undertake the biggest reclamation project in her history, and American machinery will likely play a prominent role in that gigantic rehabilitation venture. According to Aneta, Netherlands News Agency, the Netherlands government is seeking new pumping and power plant equipment to reclaim the areas already flooded by the Nazis, plus the hundreds of thousands of additional acres the enemy is expected to inundate in his desperate effort to forestall an allied invasion.

An elaborate system of dikes, sluices and pumping stations built up in Holland during many centuries is being systematically destroyed. Today this system depends upon thousands of electric pumps, steam pumps and picturesque windmills. By disabling some of these pumps the enemy has already succeeded in flooding more than 300,000 acres of valuable farm lands—an action which has made more than a half-million people homeless and will deprive the nation of millions of tons of much-needed foodstuffs.

Should an invasion of Holland be undertaken, the Germans will probably blow up these pumping stations and power plants, together with centuries-old dikes. Whatever machinery they cannot take with them the Nazis will destroy.

The forty per cent of Holland which lies below sea level is inhabited by more than sixty-five percent of her population, living in such cities as Amsterdam, Rotterdam and The Hague. It is also the most highly industrialized region and includes some of the most fertile agricultural and dairy lands of the country.

ENGINEERING ABROAD — AS SEEN BY ENR EDITORS

Steel Pontoon Cells in the South Seas

N. A. Bowers
Pacific Coast Editor, Engineering News-Record

Contents in Brief—The Navy's 5x5x7-ft. steel box pontoon units of exactly uniform size are exceeding expectations of usefulness. Though designed for versatility they are found useful in many unexpected ways and come near to being a "universal unit". As part of the equipment sent out with every Seabee battalion they are put to work quickly in wharves, barges, bridges, drydocks, storage tanks and in many other ways. Originally made only in the States, the plates are now shipped flat (knocked-down form) thereby saving 80 percent of cargo space, and are welded up by Seabee crews in assembly depots near the front.

"SOMETHING NEW HAS BEEN ADDED" to speed up every phase of our present war campaigns and though pontoons were used centuries ago, the Navy now has a new and highly efficient means of employing this device against Tojo and Hitler. The new feature, which has been an important factor in the Navy's construction operations on all fronts, notably in the Pacific areas, is the plan of making available a large number of pontoons of standard size (5x5x7 ft.) built to such accurate measurements that the units or cells are interchangeable and can be quickly fastened together in the field into almost any desired combination. These cells make possible the speedy construction in remote places of barges, drydocks, bridges, piers and a long list of other facilities. By the addition of self propulsion units, the barges can be used as tugs or equipped with cranes or tanks, can do what otherwise would require hulls so urgently needed in other service where substitution is impossible. (*ENR*, April 20, 1944, p. 540.)

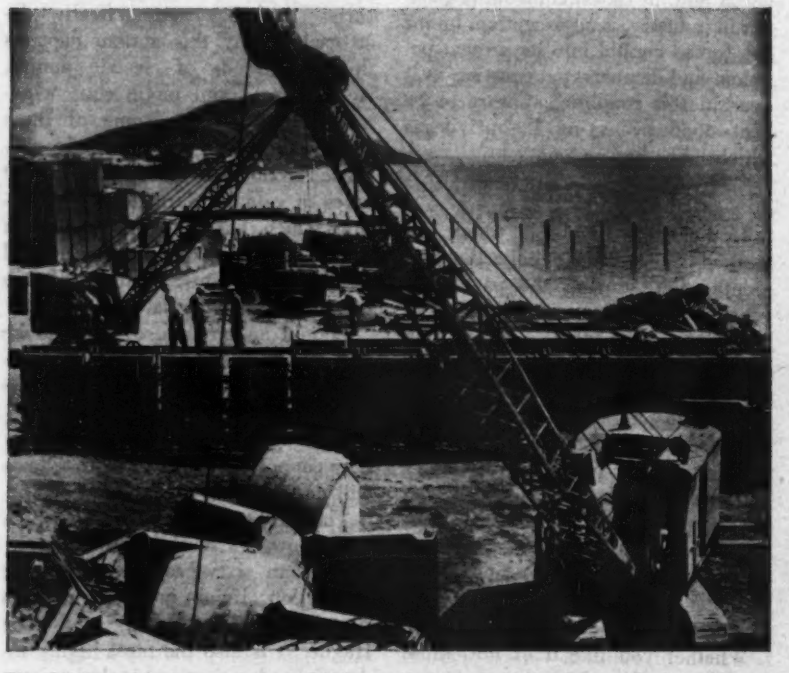


Fig. 1. Assembly of pontoon cells from storage (left background) into strings on launching ways (center) goes on speedily at many advanced bases. Curved sections in the foreground are used for the ends of barges.

Floating wharf in New Caledonia

Thus the pontoon cell made of thin steel plate has arrived as a standard item in the heavy construction field. Sometimes it is used as equipment and sometimes as material with which to build boldly and quickly for special uses. For example: At Noumea, New Caledonia, which was a large base extremely important in the early stages of the Solomon Islands campaign, there was great need for piers. Ships lay in the harbor, many of them waiting for a chance to unload and there was a long line of ships, strung out all along the Pacific headed for this distribution point. The cargoes were urgently needed at the front; they were vulnerable to attack when they lay at anchor and they had to be released as quickly as possible because of the dire shortage of ships. But there weren't enough piers. To build more called for piles, piledrivers and ex

rienced workers, all of which were rce.

Into this situation came the pontoon ls. An assembly of cells 8 strings le and 62 cells long was made to ovide a barge about 40 ft. wide by 5 ft. long—an adequate wharf area unloading even the largest of the ips used for transpacific operations. is barge, placed parallel to the ore and held in place on the harbor le by dolphins driven in about 30 of water, was connected to the ore, some 150 ft. away, by access rges or "bridges" also made of cells t together in the widths desirable shore-to-ship stream of trucks.

The wharf so made, which now has en in use for about 16 months, was rhaps the first of its size to be built. was put together and made ready service in four weeks by 24 Sea- es who worked during the 12 day- ht hours each day. (No lights were rmitted at night.) These men had en trained at the advanced base de- t and naval construction training tion at Davisville, Rhode Island. ey were kept up to date on the de- lopment of new and better assembly ocedure by publications of the Bu- u of Yards and Docks. (A recent is- e is the "Pontoon Gear Manual— stricted" dated August 1943.)

Joints permit movement

This first wharf was made rigid for full length. After a very severe orm it was decided that it would be fer if transverse joints were put ross the deck at about 18 cell in- rvals. This is about 107 ft., as the ng axis of the barge is made up of lls in the 5-ft. dimension plus ghtly less than one foot in the ints, which are filled in with closure eces. The joints are hinge connec- ons made with 1½-in. pins, cutting e top side longitudinal angles to per- it their insertion. The articulation us provided made the long barge ce to respond to wave motion and is worked so successfully that in ter wharf structures of this type it s become the practice to put in the inge joints at intervals of about 15 lls.

What was done at this first pier has nce been done many times in other rbors where a wharf was needed ickly or where the usual construc- on was not feasible for some reason. here the shore slopes too steeply to

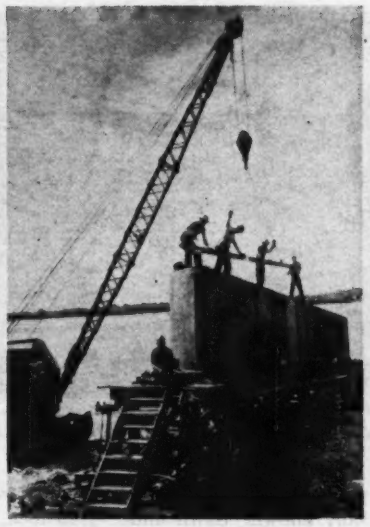


Fig. 2. Longitudinal angles are bolted firmly to the four corners of each string of cells.

make a pile wharf economical, a pontoon barge of desired width and length can be placed parallel to the shore, moored only along the shore side and made accessible by short hinged access ramps. One such wharf consists of four 6x18-cell barges (total length about 430 ft.) hinged at each junction to reduce wave stresses. This wharf had a 45-ft. water depth along its outer edge and the rocky formation would have made any form of pile construction slow and expensive.

Despite the preference for having mooring bollards or dolphins along the water side of the wharf, this one had to be built with provision for taking the ship's lines across the wharf. This was done by driving four dolphins on the inshore side of the wharf where they could also be used for holding the wharf in place. Each of these dolphins consists of five piles. Four are battered and the fifth, in the center, is plumb and extends some 6 ft. above the others for convenience in attaching mooring lines.

Accurate fabrication mandatory

Close tolerance is necessary in fabrication of the pontoons to assure rigidity and strength through the lug and wedge connections of the individual units to the long angles. Maximum variation allowed is only $\frac{1}{32}$ in. either diagonal or linear in building the pontoon. Measurement is made with a steel tape between center-punch marks in plugs screwed into the sockets used for making connections.

Experience of a West Coast firm, that did well on earlier assignments and was given a contract for 18,000 cells to be produced in 12 months may or may not be typical but work there is in line with similar reports from other war industries. The priorities allowed for materials (mostly steel plate) did not apply for the necessary welding equipment, welders were in great demand at shipyards and under close trade union restrictions so that, despite an unprecedented wage scale, the assembly of a welding crew was most difficult.

Fig. 3. A string of cells ready for launching is a rigid, rugged structure that withstands rough handling.

Fig. 4. Barges made of the cells provide excellent cargo carriers and have a surprising load capacity.

Once on the work, "experienced welders" with a record of a year or two in shipyard work, required extended special training before they could meet the close tolerances necessary on the cells. Labor turnover was high—welders did not like to work inside the cells—and the welding school had to operate continuously to train new employees. At the outset expansion and shrinkage threw the prescribed dimensions out beyond the limits of remedy by heating and jacking back into prescribed shape. When the plant finally got into steady production costs were naturally very high.

But the Seabees work in a different atmosphere. High cost of "state-side" cells did not have much influence (it is doubtful that they even knew about it) but delays in shipping out the cells which are part of every battalion's equipment and which they needed so badly, was very much in the spotlight. This brought up the question as to the possibility of pontoon assembly depots (PADs as they are now universally known "down under") in locations whence asemblies of cells could be conveniently towed to advanced bases.

Simple arithmetic showed that 80 percent of the precious shipping space on transpacific freighters could be saved if steel plates for the cells could be shipped out flat, in knocked-down form. Could the Seabees do the ticklish welding job out somewhere in "the sticks" and all on their own?

PADs near the front

Three PADs were visited. Here are representative figures obtained from officers in charge of these plants and their assistants.

Some experienced welders are found in the Seabees enlisted personnel, but a larger number of men were found who had no previous welding experience but were eager to try. They are trained as they work, after only a few hours of instruction. When first put into the PAD they are kept on th easier down-hand welding until the get the knack. Within 30 days the are usually well qualified. Thereafte they are advanced in accordance wit the skill they develop. There has bee no difficulty in getting (or training the necessary men, no grumblin about hours, working conditions a wages and the crews function lik cheerful teams should.

Two 6-hr. shifts are worked seve days a week (8-hr. shifts were tri but on the 7-day schedule were to hard on the men) and the productio has been highly satisfactory in quan tity and quality. The cells were bein turned out in final form—pressure tested twice, painted and stacked i storage with an expenditure, at on PAD, of 18.2 man-hours per cell. A first 65 lb. of welding rod was use per cell; this has now been reduced t about 40 lb. These cells all meet th same $\frac{1}{32}$-in. tolerance required of cel built on the mainland by contract.

As this is being written (in Pea Harbor) corresponding figures ar not at hand for the plants that buil (or did build) these units in th States. It would be interesting to mak man-hour comparisons—much mor so if some way could be found t bring back into the "Continenta United States" some semblance of th industrial efficiency that can be a tained once the spirit that we like t think of as "typically American" i allowed to take over. But that's an other story.

PAD practices show ingenuity

Seabee PADs make use of innume able little devices and methods de veloped and put into operation b workers interested in their jobs suc

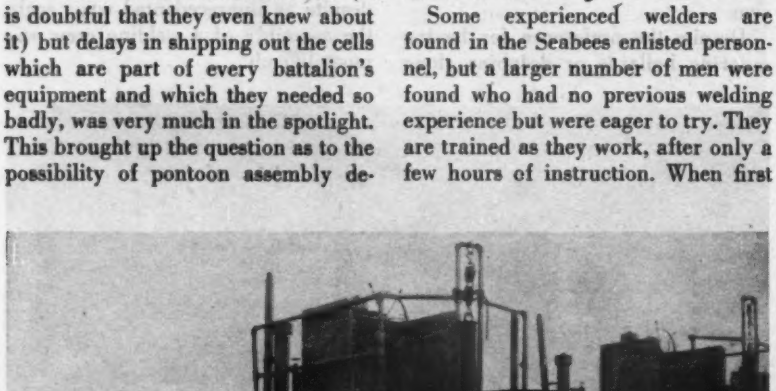


Fig. 5. Propulsion units are often attached to the stern of a barge to give it motive power. In this case two inboard power units were used on a 7-12-7 unit that served as a tugboat.

s shears for speedily trimming up a batch of plates that came from the States, through an error, slightly oversize, or a rack for adding the first stiffener angles to plates so that four or six plates can be put in at once and removed one at a time as the angles are welded on.

The line production plan is followed and from spot welding to storage in the yard, even the painting (two coats) is done without need for lifting the cell from the convenient little truck on which it rolls along. For first assembly of the plates, jigs have been developed, making use of a temporary end-plate put on the cell to provide a four-position lock so that all spot welding can be down-hand. With this rig three men in 20 min. can put the component parts through the spot-welding operation, leaving the cell ready for final, full-seam welding. All welds are made in a single pass. Corner welds are external only.

Rated on pressure tests

There are two pressure tests: First under 15 lb. per sq. in. of internal air pressure, during which seams are painted with soapsuds while the cell is struck with a 4-lb. hammer. The final test is hydraulic, a 25-lb. internal pressure. If any leakage appears the seam is chipped out and rewelded. A metal tag on each cell identifies it with the welder record and the men are rated on their relative skill in avoiding defective welds. The scores for the individual welders are publicly posted and are a matter of pride with the men—like a batting average. This is another sharp highlight in industrial contrasts. These men like their work and the freedom they have in their jobs.

As distinct from the PADs, which are actually industrial plants, the spots up nearer the front where the cells are to be fastened together into the various combinations desired, can be equipped and made operative in a few days. These are always set up on some navigable waterway; the chief requirement is a crane that can lift one of the cells. Their individual weight is not much over a ton.

Although a relatively simple operation, crews who work at it do gain speed with experience. At one time, to clear an accumulation of cells at certain key points, crews were selected, trained and sent out as specialists on this work. When the job was well along the work remaining for one 12-man crew was a number of 100-ton barges. The men wanted an assignment "up front" and were told that when they had finished the barges on order they would be moved to "where there is shooting." After this promise the crew completed one of the 4x12-cell barges (28x72-ft. deck size) every two days. As these were 12-hr. days this is 288 man-hours per barge.

Fig. 6. Barges take a beating from surf, during storms, as did this one stranded beside a pier in the Solomons.

Thickness of steel plate

To provide sufficient weight and durability to resist impact and at the same time to use the minimum amount of steel plate, the Navy recently changed specifications slightly on the cells, using lighter metal on the three faces that will always be protected from impact by adjoining faces. Rectangular cells are now made with one 5x5-ft. side and the bottom (5x7 ft.) of $\frac{5}{16}$-in. plate. The other two 5x5-ft. faces, which will not be placed outboard (port and starboard) are being made of 10-gage as a means of effecting economy in the weight of steel used.

The planned uses of the pontoons and details of connecting them were covered in the earlier article (April 20) on pontoons. It will bear repeating, however, that the units are made into barges used for cranes with sufficient capacity to handle a PT boat and for drydocks capable of lifting small ships. Utilization in highway structures is to be described in a subsequent article.

Use in the simple barge form is probably the most valuable single service rendered by the cells, especially now that powerful inboard and outboard propulsion units are available to move barges from 50 to 400-ton sizes under their own power. Sometimes with two inboard marine tractors the pontoons become tugs, invaluable in emergencies.

Practically unsinkable

In one remote spot where the only port facility is a "finger pier" made of coral, the outer end of the pier has been faced with a string of cells, filled with water and well tied back to deadmen. To the solid face thus provided, a 4x12-cell barge assembly is fastened by means of a cell ramp; the latter is to allow for tidal changes.

The barge connections are of the hinge-pin type and on occasion the barge is quickly detached and moved out alongside a vessel anchored in deep water. When the ship's booms have transferred freight to the barge, it comes back to its pier where trucks pick up the freight and haul directly to points ashore.

One 5x12-cell barge (100-ton) was used to ferry freight ashore from a steamer anchored near the beach in a vulnerable position. While in service this barge was frequently subjected to airplane bombing attacks and received a total of six direct hits. The value of the cellular structure was here well demonstrated. The hits did not put this barge out of commision—in fact it is still in service.

Are Timber Checks and Splits Serious?

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***Contents in Brief**—Working stresses for structural grades of lumber make allowance for checks and splits normally expected. Extensive checks and splits at sharp angles with axis of piece and movement from excessive stress being potentially dangerous, should be studied more carefully. In most cases, however, timber framing requires only that fastenings be kept tight to maintain it in structurally sound condition. The suggestions presented here come from a group of experienced timber engineers and reflect their knowledge of test data, timber mechanics and field performance over a long period of years.*

THE ENORMOUS DEMAND for lumber in wartime construction has often made it necessary to depart from peacetime practices. During the war a great quantity of unseasoned material has been used. In some emergency cases it was necessary to use non-structural material (material not graded for strength) or material of a structural grade lower than specified. Sometimes the design, fabrication and purchasing were carried out by relatively inexperienced personnel. In view of these conditions, it is desirable that those charged with the maintenance of such structures inspect them with the thought of taking such corrective measures and providing such servicing as engineering judgment shows necessary.

Engineers whose timber experience has been limited to wartime building are sometimes at a loss to determine whether or not the checks and splits that develop in recently built timber structures cause a serious reduction in strength. In some cases expensive and unnecessary repairs and replacements are being made on members that, despite checks, still have the full load carrying capacity for which they were designed. Where unseasoned material has been used, however, it is particularly important that the nuts be turned up on the bolts to keep the faces of adjacent members in contact. Otherwise, stress distributions and intensities not contemplated in establishing allowable stresses for lumber and allowable loads for fastenings may develop.

Checks usually are harmless

Careful observation and correct analysis should be made to determine which checks are the result of normal seasoning action and cause no weakening of the structure and need no repair, and which checks and splits, if any, indicate overstrain, loss of strength, actual or potential failure and require repair. Checks and splits can be properly evaluated only in relation to their position in the member and in the structure. A split in one position may demand immediate replacement of the member while a similar defect in another location need not be cause for concern.

Checks and splits have been blamed for sagging of trusses where actually there has been no movement. Many cases are on record where camber was specified but not built into trusses and subsequent normal deflection, which appeared to be excessive settlement, was erroneously attributed to excessive checking and splitting or some other cause which created concern as to the structural adequacy of the building.

General information is presented here as a guide to indicate whether or not a check or split is serious, rather than as rules for definitive action. In all cases, inspection of individual members and joints should be the guiding factor as to what action, if any, is to be taken. Excessive relative movement of members at a joint, bowing of a compression member (shown by broken paint lines or newly exposed wood) and any other evidence of distress, such as elongated bolt holes, should be carefully studied.

DEFINITIONS

CHECK—a surface opening caused by seasoning. Does not extend through the thickness of the piece and follows the grain of the wood.

SPLIT—(a through check)—lengthwise separation of the wood extending from one surface through the piece to the opposite surface or to an adjoining surface.

SHAKE—a separation along the grain, most of which occurs between the rings of annual growth.

STITCH BOLT—a small bolt (generally ⅜ in. or ½ in. dia.) placed in a member to prevent enlargement of checks or splits.

BOLT AREA—area bounded by lines parallel to longitudinal axis of the piece and ¼" outside each of the two tangents to the bolt, Fig. 2, not to be confused with bearing area.

CONNECTOR AREA—the area between lines tangent to the connectors and parallel to longitudinal axis of the piece—not to be confused with bearing area.

SAW KERF—an artificial, predetermined, split of limited length made by sawing through and parallel to the axis of a piece, thus preventing uncontrolled location and direction of a possible natural split or check. Purpose is the same as a longitudinal joint in concrete pavement.

COMPRESSION MEMBER—for purposes of these data is defined as a member which is loaded axially in compression.

TENSION MEMBER—loaded axially in tension.

In seasoning, which is primarily the loss of moisture from lumber, the wood shrinks in its cross sectional dimension until it reaches a moisture equilibrium with the surrounding atmosphere under service conditions. Since lumber dries more rapidly through the ends than through the sides, more serious checking or splitting may result at the ends than through the body of the piece. End drying can be minimized by application of paint coatings to the material while unseasoned.

Since most of the dimensional change from loss of moisture takes place in the cross sectional direction and is negligible in the axial direction of the piece of lumber, multiple fastenings in a joint where members join at large angles may set up restraint tending to prevent movement and thereby accelerate checking or splitting. The resulting checking and splitting tend to relieve the internal stresses and therefore may be helpful rather than detrimental.

Structural (strength) grades of lumber are not required to be clear, straight-grained, unblemished material. Since trees will not grow without leaves and branches, which form knots at their junction with the tree trunk, it is impractical to limit building lumber to grades without knots and deviations from straight grain. Consequently, commercial strength grades of lumber permit the inclusion of specified knots and other characteristics of a tree.

Allowance for normal defect

The working stresses for strength grades include appropriate downward adjustments of clear wood stresses to make allowance for sizes and location of knots, slope of grain, shakes, checks and splits permitted in the particular grade.

In general, clear wood working stresses are derived from strength tests of unseasoned material. The increase in strength of material which accompanies the drying of wood below fiber saturation of the cell walls, tends to offset seasoning characteristics, such as checks and splits. Nevertheless, since seasoned material may be used under submerged (wet) service conditions, working stresses for structural grades (except for joists and plank grades where some credit for dryness is taken) are based on unseasoned material after making deductions for splits, checks, and similar normal defects of lumber.

Stress transmittal through a timber joint requires that the faces of the members be kept in close contact. This can be assured only by servicing the structure to keep the bolts tight until moisture equilibrium between the wood and its surroundings is reached.

The working stresses, and consequently the allowances for defects, vary with specific strength grades of a given species. The corresponding permissible characteristics are specified in detail in the grading rules. However, because the same sound basic engineering principles and test data are applied to all strength grades, the working stresses for the lowest strength grade are just as reliable as those for the highest quality of timber.

Some requirements for appearance

In some cases, particularly in axially loaded members such as columns, the restrictions imposed by the grading rule on slope of grain and size of check are made more severe than required by strength considerations in order to maintain better appearance. For example, even though the grading rules would exclude such a piece, a column may be checked nearly through without seriously reducing its strength because the main consideration is that the member act

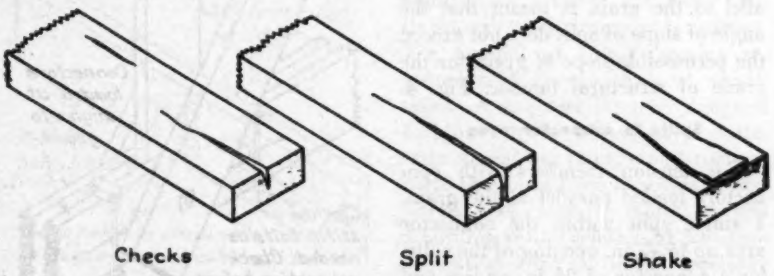


Fig. 1. Checks, splits and shakes are detrimental in some locations, harmless in others.

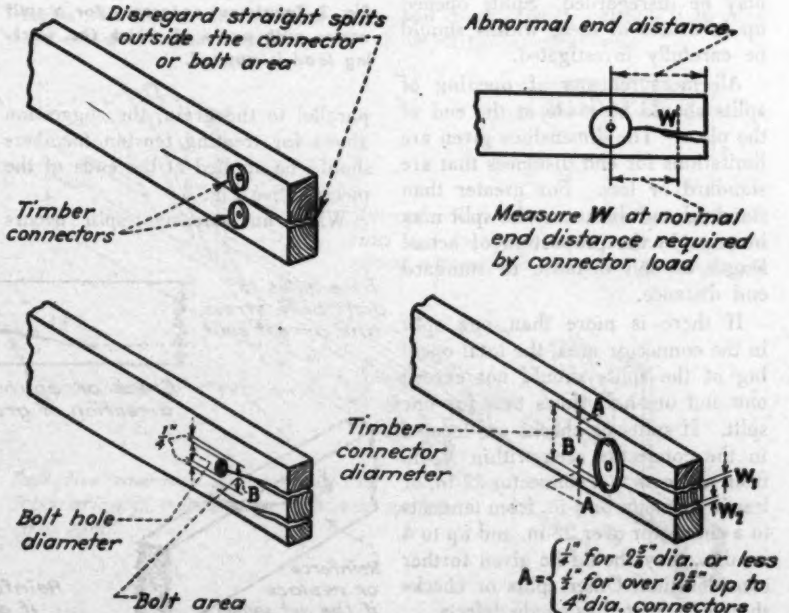

Disregard straight splits outside the connector or bolt area
Timber connectors
Abnormal end distance
W
Measure W at normal end distance required by connector load
Timber connector diameter
Bolt hole diameter
Bolt area
A
B
W1
W2
A = 1/4" for 2 5/8" dia. or less
1/2" for over 2 5/8" up to 4" dia. connectors

Fig. 2. Straight grained splits outside connector or bolt areas may be disregarded. Inside connector areas the maximum permissible single split, W is 3/16 in. for 2⅝-in. dia. or smaller connectors and ¼-in. for over 2⅝-in. to 4-in. dia. connectors. Maximum sum of more than one split, $W_1 + W_2 + \ldots$ within the dimension B may be 1½ times that of a single split.

as a unit without splitting entirely into two parts, and reducing the $\frac{l}{d}$ ratio.

At the ends of the members stressed in compression parallel to the grain, checks and splits may be disregarded, provided there is no evidence of slip from wedging action of connectors and bolts. Tests at the U. S. Forest Products Laboratory, with deliberate saw kerfs simulating deep checks opposite each other in pieces loaded both parallel and perpendicular to grain, showed that within the limits of the tests the saw kerfs had practically no immediate effect on the strength of the joint.

For members stressed in tension parallel to the grain, splits outside the connector area that are approximately parallel to the grain may be disregarded. By approximately parallel to the grain is meant that the angle of slope of split does not exceed the permissible slope of grain for the grade of structural lumber. Fig. 4.

Splits in connector area

For tension members with connectors loaded parallel to the grain, a single split within the connector area up to $\frac{3}{16}$ in. opening of the splits for a connector of $2\frac{5}{8}$ in. or less and a split of ¼-in. for connectors with diameters over $2\frac{5}{8}$ in. up to 4 in. may be disregarded. Splits opened up in excess of these widths should be carefully investigated.

All measurements of opening of splits should be made at the end of the piece. The dimensions given are limitations for end distances that are standard or less. For greater than standard end distances, the split may increase in the proportion of actual length of end distance to standard end distance.

If there is more than one split in the connector area, the total opening of the splits should not exceed one and one-half times that for one split. If splits or checks are located in the connector area within ¼-in. from tangents to a connector $2\frac{5}{8}$-in. or less in diameter or ½-in. from tangents to a connector over $2\frac{5}{8}$-in. and up to 4 in. dia., they should be given further consideration. Other splits or checks should be treated as single defects.

Angles make a difference

For end splits either in tension or compression members with connector loads acting in a direction other than

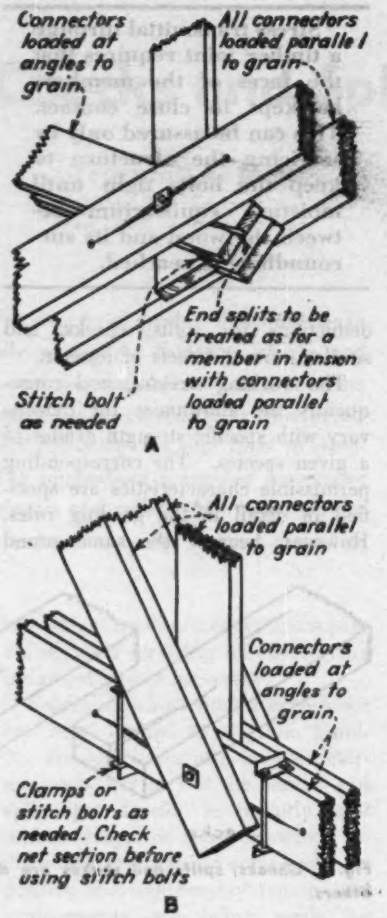

Connectors loaded at angles to grain
All connectors loaded parallel to grain
End splits to be treated as for a member in tension with connectors loaded parallel to grain
Stitch bolt as needed
A
All connectors loaded parallel to grain
Connectors loaded at angles to grain
Clamps or stitch bolts as needed. Check net section before using stitch bolts
B

Fig. 3. Treatment necessary for a split varies with angle at which the working load is applied.

parallel to the grain, the suggestion above for treating tension members should be applied at the ends of the pieces. (See Fig. 3.)

When an extensive split occurs within a connector area at a joint other than at the end of a member, installation of stitch bolts or clamps on each side of the joint containing the split should be considered. When stitch bolts are used, insertion at large knots should be avoided and the member should be investigated to determine that the required net section is maintained.

If a split in a member shows the slope of grain to be greater than that permitted in the structural grade required, critical members stressed in tension should be replaced or reinforced. If a split develops in lumber having a slope of grain permitted in the structural grade but is of such a nature that it may tend to split the member into two pieces, the member should be replaced or reinforced.

Checks and shakes

Normally, checks are of relatively little importance but, if they are of an extensive and deep nature, their seriousness may be evaluated from the suggestions on splits on a basis of their relative importance compared with splits.

In connector construction, shakes in the connector area that are approximately parallel to the contact faces and within a zone having a depth ¼ in. greater than the depth of penetration of the connector into the wood, or which eventually may result in separation of a portion from the rest of piece, should be carefully investigated. (See Fig. 5.) Other shakes may be disregarded as such and be evaluated as a check or split.

In general the data under connectored construction will apply to

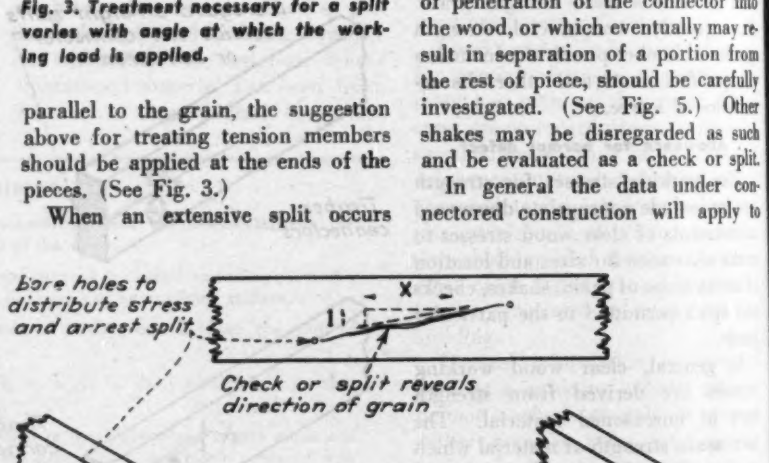

Bore holes to distribute stress and arrest split
1 in X
Check or split reveals direction of grain
Reinforce or replace if the net section is materially reduced
Reinforce or replace if danger of complete separation

Fig. 4. Unless net section is reduced, disregard split when the slope of grain (1 in X) is within the limitations of the structural grade. A split probably is not harmful unless part of the joint is in danger of separation from the main piece. In the latter case it is necessary to reinforce or replace defective member.

bolted construction except that splits within the bolt area should be further investigated. Other splits may be disregarded.

Stitch bolts

When used at the end of a piece, stitch bolts should be placed between 2 in. and 3 in. from the end. Small $\frac{3}{4}$ or $\frac{1}{2}$ in. dia. bolts are suggested. Ordinarily, when bored at a critical stress section of a member, the area of cross-section removed by the hole for the stitch bolt should not exceed the cross-sectional area occupied by the maximum knot permitted in the structural grade. In drawing up the stitch bolts they should be tightened only to the point where the bolts begin to take tension. No attempt should be made to close a split or check as this may extend the split on the other side of the joint. In servicing structures, stitch bolts should be tightened as well as other bolts.

Saw kerfs control splits

In wide splice pads and other axially loaded members, it is desirable to place saw kerfs between rows of connectors or use two narrow pieces to control any possible splitting. Where the kerf runs into the end but not the entire length of the piece, a hole (not exceeding $\frac{3}{8}$ in. to $\frac{1}{16}$ in. dia., depending on the width of the piece) should be bored at the end of the kerf to avoid its extension. When making kerfs, in so far as possible, the edge distances with respect to connectors should be maintained as required at the edge of the piece. (See Fig. 6.) The use of saw kerfs is more important in grades that permit steep slope of grain than in those requiring relatively straight grain because the split, pending to follow the slope of the grain is more likely to be dangerous.

Reinforcement and repair

For design of repairs and replacements as well a sdesign of current and postwar structures, War Production Board Directive 29, issued August 9, 1943, for the *Design, Fabrication and Erection of Stress Grade Lumber and Its Fastenings for Buildings* should be followed. These specifications list the present commercial structural (stress or strength) grades with appropriate working stresses therefore, allowable loads for fastenings, and the most authentic up-to-date design procedures.

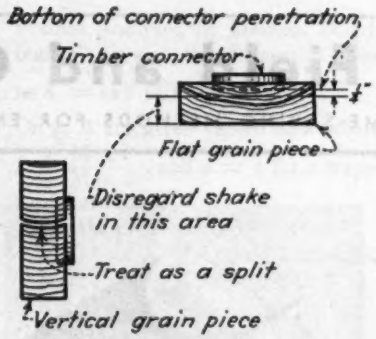


Fig. 5. In flat grain pieces a shake below the connector may be disregarded unless there is danger of separation from the main body. In vertical grain a shake across the thickness of the piece has the appearance of a split and can be treated as such.

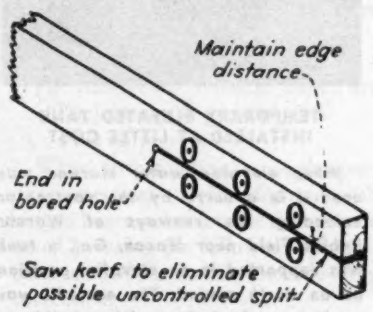


Fig. 6. Saw kerfs entirely through a piece control splits and checks. A bored hole at the end of the kerf distributes the stress concentration and stops extension through splitting.

When repairs or reinforcements are made, the distribution of stresses between members should be rechecked to avoid improper design. When repairing one leaf of a multiple leaf member preferably all leaves should be spliced between the same panel points to avoid eccentric distribution of loading caused by differential deformations of the various leaves. (See Fig. 7.)

All the recommendations contained herein are predicated on the bolts at joints being tightened and kept tight. In structures subject to vibration some form of stop nut or lock nut should be employed. The most important item of servicing is to keep faces of members in contact by keeping bolts turned up until moisture equilibrium between the wood and its immediate environment is reached. The amount of bolt tightening required will vary with local conditions. A structure properly designed and built from well-seasoned materials should not require bolt tightening. One built from unseasoned materials will require more or less according to the relation of moisture content at time of initial assembly to moisture stability of the structure.

One final word of caution—an experienced engineer should supervise and check repairs and bolt tightening on all timber structures.

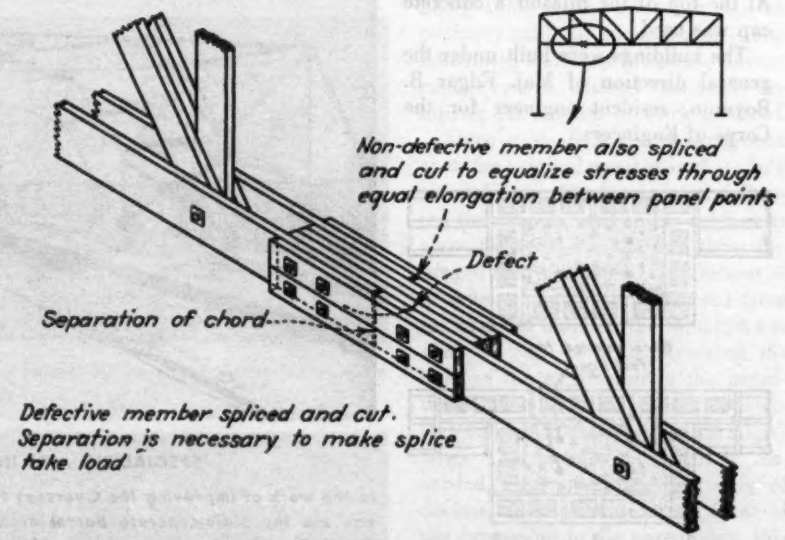

Non-defective member also spliced and cut to equalize stresses through equal elongation between panel points
Defect
Separation of chord
Defective member spliced and cut. Separation is necessary to make splice take load

Fig. 7. Where necessary to splice one chord at a defect, splice both and cut original lumber entirely through to make splice take the load and distribute the stress equally. Chords can be cut after splicing by boring adjacent vertical holes across the narrow face of the piece. If space between the chords is not adequate for split-ring insertion, use toothed ring connectors or bolts only.

From Field and Office

WORKING PROBLEMS AND TIME-SAVING METHODS FOR ENGINEERS AND CONTRACTORS

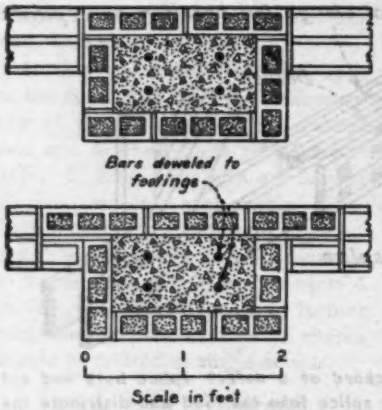
Hollow Tile Used For Forms

On construction of a group of repair and maintenance buildings at Warner Robins Army Air Field, Macon, Ga., hollow tile was used extensively for the wall construction. An early scheme, where pilasters were needed, was to thicken the wall with a number of tile set on end, and then, after the desired reinforcing steel was added, to fill the tile with concrete rodded in place. This method proved time consuming and required lots of hard work to fill the tile completely.

A more successful plan, which is illustrated by an accompanying drawing, consisted of using hollow tile filled with concrete as a form to construct a reinforced concrete core. This plan not only eliminated the difficult work of adding concrete in a tile containing steel, but it also eliminated the need for form lumber, a very critical item during much of the work. In addition the interior face of the finished wall was improved in appearance.

In constructing this type of pilaster, the brick work was carried to full height before the concrete was added. At the top of the pilaster a concrete cap was used.

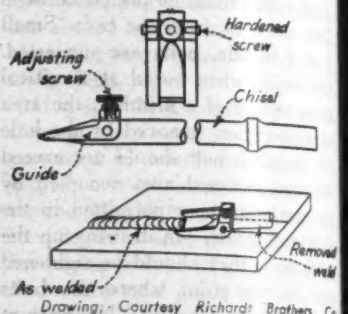
The buildings were built under the general direction of Maj. Edgar B. Boynton, resident engineer for the Corps of Engineers.



Detail of alternate courses of a 16 x 24-in. pilaster built with forms of hollow tile.

TEMPORARY ELEVATED TANK INSTALLED AT LITTLE COST

When elevated water storage was needed in a hurry by the contractor extending the runways of Warner Robins Field near Macon, Ga., a tank was supported in an elevated position on an earth mound. The earthfill was made in a short time with a bulldozer and a carrying scraper.



Drawing, Courtesy Richardt Brothers, Co.

CHISEL REDUCES WELDING COSTS

A weld-removing chisel of the type shown above, designed by Russell Meredith, Los Angeles, Calif., saves many hours of finishing time. Its purpose is to remove the surface of the weld without injuring the parent metal. Attached to the end of an air gun, the tool permits a weld to be finished for 0.15c. per ft., whereas by grinding the cost had been 0.50c. per ft.

Originally designed for use on soft materials such as aluminum, bronze, magnesium, etc., the tool may also be used on soft steel where flush, smooth finishes are required.

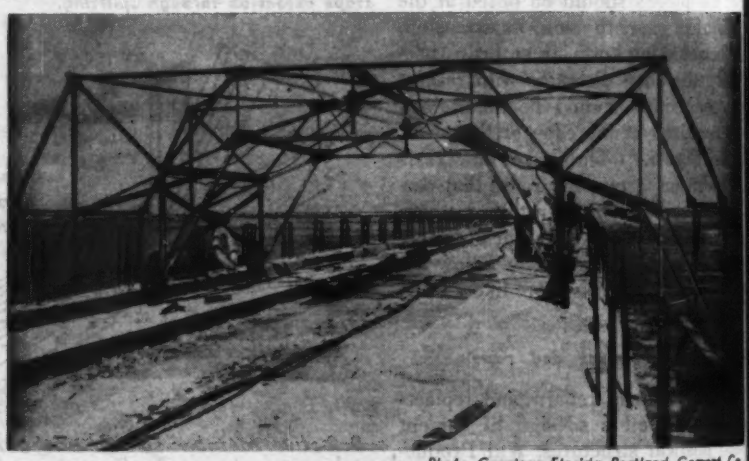


Photo Courtesy Florida Portland Cement Co.

SPECIAL RIG AIDS IN REMOVAL OF FORMS

In the work of improving the Overseas Highway to Key West, Fla., so that traffic can use the plain-concrete barrel arch bridges of the abandoned Florida East Coast Ry., the rig shown above proved of value in removing the forms for the overhanging portions of the new deck. The frame was built sufficiently high to permit trucks to pass through, thus creating no barrier to traffic. The overhanging frames each supported a platform that hung outside and below the deck. Workmen constructing the guard rails also found the rig of value, as did the painters. S. J. Groves & Sons Co. constructed the piece of equipment.

Field and Office Comment

Special Application of Moment Distribution Method

Sir: When investigating a rigid-frame building it is frequently necessary to determine the stiffness of a member having a constant depth and a variable width. The usual method is to assume an average width. While this method does not usually involve any great error, it is almost as easy to solve this problem exactly by the special moment-distribution method indicated by Figs. 1 and 2.

Assuming a bent as shown in Fig. I. It is desired to determine the relative stiffnesses of the members at Joints 1 and 2

The moment of inertia of the beam is $I = \frac{1}{12} \times 1 \times (1.67)^3 = .388$ and $I/L = .0194$

The average value of the I for the post is $I = \frac{1}{12} \times 2.13 \times 8 = 1.422$ and $I/L = 0.0646$

The relative stiffnesses at Joint 1 are
Beam 23 percent
Post 77 percent

The relative stiffnesses at Joint 2 are
Each beam 19 percent
Post 62 percent.

A more accurate value for the post can be found as follows:

In bulletin ST-41 of the Portland Cement Association, titled "One-Story Frames Analyzed by Moment Distribution", on p. 1, the stiffness is given as $K = (k)\ (E)\ \frac{\text{Min } I}{L}$

On p. 4 are given values of k where $b = \frac{\text{Min. } I}{\text{Max. } I}$, and $a = 1$ for a trapezoidal section.

For the post assumed
Min. $I = \frac{1}{12} \times 1.25 \times 8 = 0.835$
Max. $I = \frac{1}{12} \times 3.00 \times 8 = 2$
$b = 0.84/2 = .42$
$k = 8.2$

The stiffness of the post $= 8.2 \times \frac{.835}{22} = 0.311$

Since the values given in the chart are the absolute values it is necessary to multiply the stiffness of the rectangular beam as found above by four or $0.019 \times 4 = 0.076$

The relative stiffnesses at Joint 1 are
Beam 20 percent
Post 80 percent

The relative stiffnesses at Joint 2 are
Each Beam 16 percent
Post 68 percent

When investigating a single-span, unsymmetrical rigid frame with hinged bases, considerable time can be saved by using the following approximate method for making the side-sway correction.

Prof. Charles A. Ellis, on p. 20 and 30 of Engineering Bulletin 79 of Purdue University, points out that for a single-span, symmetrical rigid frame, with hinged bases, the sum of the corner moments is constant. This statement is true whether side-sway is permitted or prevented.

Applying this to the example in bulletin ST-41 the values shown by Fig. 2 are obtained.

If side-sway is permitted

$$H_1 = H_2$$
$$18H + 20H = 44.3$$
$$H = 1.166$$
$$M_A = 1.166 \times 18 = 21.0$$
$$M_B = 1.166 \times 20 = 23.3$$

These figures agree with the result shown on Fig. 17 of the Portland Cement Association Bulletin.

If the heights of both posts are the same, the corner moment would be

$$\frac{M_A + M_B}{2}$$

This method does not apply if the posts have fixed bases.

The above approximate method holds true within the range usually encountered, since the longer post will usually have a larger I, thus reducing the effect of dissymetry.—Otto Ebel, *Designer, Consolidated Edison Co. of New York, Brooklyn, N. Y.*

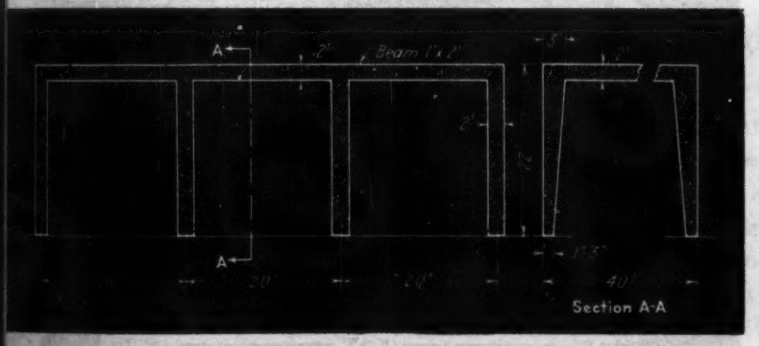


Fig. 1. This rigid frame problem can be solved by an exact method almost as quickly as by most approximate methods.

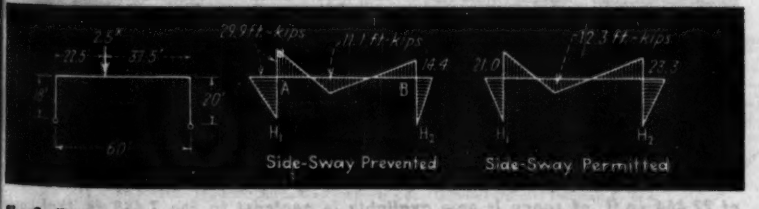


Fig. 2. For a single-span, rigid frame with posts hinged at the bottom the sum of the corner moments is constant whether or not side sway is prevented.

Binomial Theorem Is Best

Sir: Recent attention given to the quick and sufficiently accurate extraction of cube roots seems to call for the statement that a strict application of the binomial theorem is best, this being aided by the slide rule and an ordinary table of squares and cubes. Attempted shortcuts introduce unwarranted errors, without materially reducing the amount of work involved.

Since $a + b$ is the desired cube root, the original number is $a^3 + 3a^2b + 3ab^2 + b^3$. Instead of following the process used in the arithmetic class, the term a is the first three figures of the root, and b is all the rest of it. After a^3 has been subtracted from the original number, the remainder is $(3a^2 + 3ab + b^2)b$. Knowing the bulk of the expression in the parenthesis, the slide rule gives a satisfactory value of b to be used in the "$3ab$" term. The b^2 may be used or discarded, as desired, it being only of decimal value. Having a fair value of the expression in the parenthesis, this is used as a divisor and the division should be carried out by pencil to determine the real value of b, which comprises the remaining desired figures of the root. Any reasonable error

in the divisor will be only in the last figure of a large number and so will have a small effect on the final result.

As an example, the number 103,157.89 is chosen because it offers about the greatest chance for slide rule error. The cube root, as found by the hard-labor method, is 46.89942125.

The first three figures are taken from the table, being the greatest number whose cube is less than the original number. And this cube is subtracted. Also, the square of this number is taken from the same line of the table. The work follows, the last three figures being obtained by a slide rule continuation of the division.

$a^3 = (468)^3 = 219024$

3

657072 103,157.89 (46.8994212

$3ab = 1404b =$ 1397 $a^2 = 102\ 503\ 232$

658469) 654 6580

592 6221

62 03590

59 26221

2 773690

2 633876

139814

Had there been a discrepancy of as much as *six* in the last figure of the divisor, due to careless work with the slide rule, the resulting error would be only *one* in the eighth figure of the root.

After once having watched a gang of Japs extracting a cube root by means of an abacus, I am convinced that even that device cannot offer any improvement over our own methods. —LEONARD C. JORDAN, 9 *North Ave., New Rochelle, N. Y.*

Moisture in Sand Found With Simple Apparatus

Sir: Apropos the determination of free moisture in sand as a function of its surface dry weight the following method has been used in England for many years. It is based on the principle that a volume of water suspended in water from a balance shows no weight on the scale. The apparatus required is any kind of a water container, a small can, with a few perforations, suitable for suspending from the balance, and either a sensitive spring balance or a scale similar to an assayer's field balance.

The first step is to take a sample of the sand being used and surface dry it—say with paper towels or other suitable means. Next, in the container, suspended in the water in the pail, is added a known weight of surface dry sand, the submerged weight registered on the balance being noted or, in the case of the swing balance, the latter is balanced by a weight which is then fixed in position on the weight arm. This operation needs to be done only once with any given run of sand and is no more trouble than determining the specific gravity.

The surface dry sample is then removed from the container. To determine the moisture from the stock pile sample, a known weight, somewhat greater than the weight of the surface dry sample is taken. From this moist, weighed sample a sufficient amount is then spooned into the container, suspended in the water, until the balance shows the same reading as before. Evidently the weight of surface dry sand in the container is the same as before. The difference between the original weight of the moist sample and the remaining weight is the moist weight of the material placed in the container. The moist weight of the sand spooned into the container less the standard weight of surface dry sand gives the weight of moisture in the sample, and for this the percentage may be calculated.

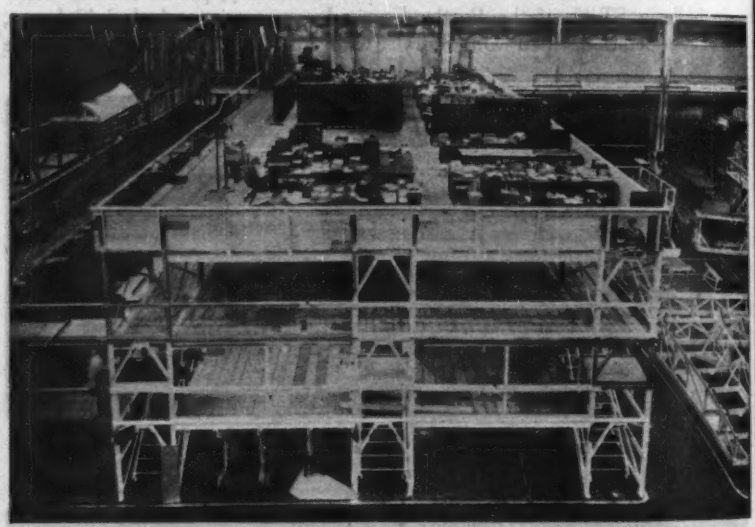
If desired tables may be made up for quick reference. There are many ways of determining moisture, and no claim is made that this particular method is better than any other; it is merely convenient at times.—C. J. SEIBERT, 6310-8*th St. N.W., Washington, D. C.*

Simplified Return Curve Formula

Sir: After reviewing the method of solving return curve problems as presented by Dan K. Conger in the May 18, 1944, issue of *Engineering News-Record*, p. 763, it appears to me to be much more simple to find the radius of the return curb by simple division from the formula

$$r = \frac{\pm \frac{R^2}{4C} - C}{\pm \text{Cos. } \phi - \frac{R}{2C}}$$

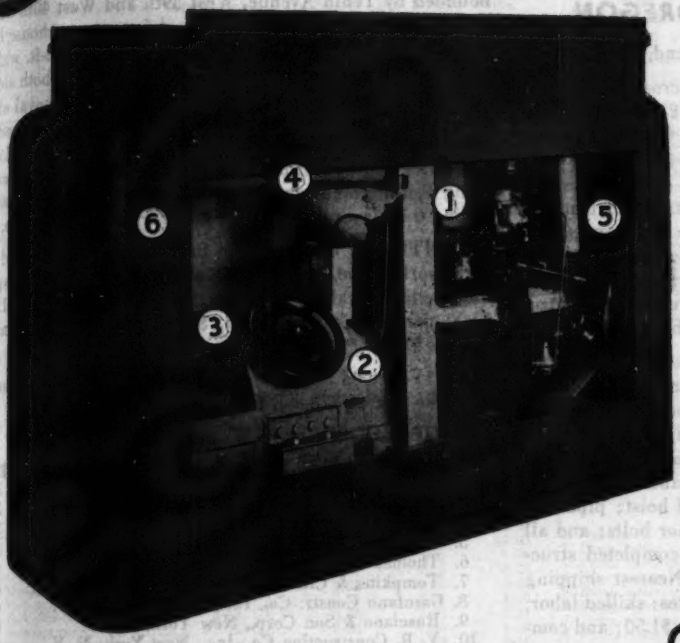
The plus or minus signs to be used in the numerator as in the right hand of Mr. Conger's formula, and in the denominator as in the left hand of his formula.—JOHN B. TEW, *Box 143, Baden, Pa.*



FOUR-STORY OFFICE ADDED IN ASSEMBLY BUILDING

When assembly line changes at the Glenn L. Martin Co. plant in Baltimore, Md., made available some floor space in one of the assembly buildings, engineers made the most of the available area by the method shown above. Created as an emergency measure to meet a critical floor space problem, the new offices will be occupied by clerical workers, and light manufacturing groups. A total of 22,464 sq.ft. of space is now available in contrast to the 7,488 ft. that could have been used for heavy manufacturing.

6 Features give the 'YELLOW JACKET' its famous penetrating "stinger"



1 **New, improved idling device acts instantly—needs no maintenance.**

2 **Convenient handwheel provides easy, and accurate current control.**

3 **Wide current range divided into 'high' and 'low' by a Selector Switch.**

4 **Over-size gas tank eliminates frequent shutdowns for refueling.**

5 **Industrial type radiator with protecting grille for ample cooling of engine.**

6 **Sturdy, weatherproof case, finished in moisture-proof enamel, completely shields internal parts against entrance of rain, sleet, etc.**

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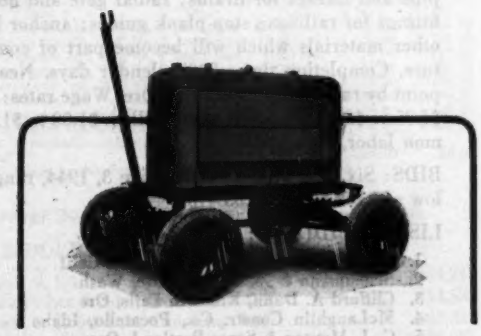

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CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

CROOKED RIVER CROSSING DESCHUTES PROJECT, OREGON

OWNER: U. S. Bureau of Reclamation, Bend, Ore.

PROJECT: Constructing Crooked River crossing, a reinforced-concrete structure approximately 672-ft. long on the North Unit Main Canal, Deschutes Project, Oregon. Consists of inlet structure with wasteway, a concrete flume 10-ft. wide by 9½-ft. deep and 521-ft. long, and an outlet transition structure. Flume to be supported on pedestals and bents at the abutments, and central portion of flume to be supported by an arch-type structure 266 ft. between abutments. Concrete slab to be placed on top of flume to form roadway 13-ft. wide. Wasteway to consist of radial-gate structure to control the waste flow, and an unlined channel about 150-ft. long extending to river channel.

CONDITIONS: Government to furnish cement; sand and coarse aggregates; reinforcing bars; posts and timber for railings, but not lumber for forms or other temporary construction; rubber water stops; elastic joint-filler material and coating material; metalwork for fixed and expansion bearings; pipe and fittings for drains; radial gate and hoist; pipe and fittings for railings; stop-plank guides; anchor bolts; and all other materials which will become part of completed structure. Completion time: 240 calendar days. Nearest shipping point by railroad is Terrebone, Ore. Wage rates: skilled labor, $1.35 to $2.00 per hour; semi-skilled, $1.00 to $1.50; and common labor, 95c.

BIDS: Six bids were received June 3, 1944, ranging from the low of $162,406 to $285,475.

LIST OF BIDDERS:

1. David A. Richardson, Santa Cruz, Calif. $162,406
2. Scheumann & Johnson, Seattle, Wash. 163,950
3. Clifford A. Dunn, Klamath Falls, Ore. 170,658
4. McLaughlin Constr. Co., Pocatello, Idaho 179,977
5. C. J. Montag & Sons, Portland, Ore. 185,510
6. Otis Williams & Co., Helena, Mont. 285,475

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, common	1,600 c. y.	$10.00	$6.00	$3.50
2. Excavation, rock	2,800 c. y.	12.00	6.00	7.00
3. Backfill	2,600 c. y.	.60	1.50	.75
4. Compacting backfill	1,000 c. y.	1.00	1.50	1.25
5. Concrete in abutments and pedestals	600 c. y.	30.00	30.00	30.00
6. Concrete in inlet, check, wasteway, inlet and outlet flumes, and outlet transition	330 c. y.	40.00	40.00	29.00
7. Conc. in bents and spans 1 to 5, inclusive	1,320 c. y.	40.00	55.00	65.00
8. Place reinforcing bars in inlet, check, wasteway, inlet and outlet flumes, and outlet transition	41,000 lb.	.02	.03	.06
9. Place reinf. bars in bents, abutments, pedestals and spans 1 to 5, incl.	372,000 lb.	.0275	.03	.04
10. Welding 1¼-in. square reinf. bars	16 welds	5.00	10.00	5.00
11. Place elastic filler mat'l. in joints	200 s. f.	1.00	1.00	.50
12. Place rubber water stops in joints	180 l. f.	.70	1.00	1.50
13. Constructing timber railings	8 Mbm.	40.00	100.00	80.00
14. Install radial gate and radial-gate hoist	7,200 lb.	.05	.10	.14
15. Install miscellaneous metalwork	20,000 lb.	.10	.10	.15

PAVING AND GRADING NEW YORK

OWNER: Port of New York Authority, New York, N. Y.

PROJECT: Paving and grading entrance to North Tube of Lincoln Tunnel from Tenth Avenue to the New York Plaza of Tunnel (Contract MHT-67). Includes grading of ar bounded by Tenth Avenue, West 39th and West 40th Stree and New York Plaza; demolition of 5-story warehouse buil ing; paving of a bituminous concrete roadway 33-ft. wide b tween Tenth Avenue and the Plaza; curbs along both sides roadways; installation of three street lights; removal of p tion of east wall, sidewalk and conduits of the plaza, and co structing in their place a roadway, expansion dam, steel cur and brick wall returns; construction of concrete sidewal along Tenth Avenue and West 40th Street; and furnishing a rolling 6-in. layer of broken stone over the graded areas.

CONDITIONS: Contractor to furnish all materials and co plete work in five months. Rail, highway and water transport tion facilities available. Wage rates are: skilled labor $1.50 $2.00 per hour; semi-skilled, $1.10 to $1.50; and comm 95c. to $1.10.

BIDS: Fourteen bids were received May 2, 1944, rangi from the low of $28,838 to $57,116.

LIST OF BIDDERS:

1. Del Balso Constr. Co., New York, N. Y. (low bidder) $28,8
2. A. D'Angelo & Sons, Inc., Bronx, N. Y. 37,8
3. Harry Hershon Co., New York, N. Y. 38,7
4. Albert A. Volk Co., Inc., New York, N. Y. 39,5
5. George J. Atwell Found'n. Corp., New York, N. Y. 39,6
6. Thomas Crimmins Cont'g. Co., New York, N. Y. 41,5
7. Tompkins & Crawford, Brooklyn, N. Y. 43,2
8. Garofano Constr. Co., Inc., Mt. Vernon, N. Y. 47,0
9. Rusciano & Son Corp., New York, N. Y. 49,8
10. V. B. Construction Co., Inc., New York, N. Y. 49,8
11. Delma Engr. Corp., Bronx, N. Y. 51,8
12. A. DeBevoise Co., Inc., Corona, L. I., N. Y. 52,4
13. Tufano Cont'g. Corp., Jamaica, N. Y. 53,9
14. Reese-Tubman Co., New York, N. Y. 57,1

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Class A excavation	6,700 c. y.	$1.50	$3.10	$
2. Class B excavation	1,650 c. y.	1.50	4.00	
3. Concrete	90 c. y.	15.00	20.00	
4. Conc. sidewalk, 8-in. thick	465 s. y.	2.25	3.00	
5. Conc. sidewalk, 8-in. thick	30 s. y.	3.70	4.00	
6. Concrete curb	560 l. f.	1.00	2.00	
7. Granite header	65 l. f.	1.50	4.00	
8. Relaid granite curb	20 l. f.	1.50	2.00	
9. Steel curb	250 l. f.	2.50	3.00	
10. Structural steel	5,000 lb.	.09	.13	
11. Cast iron	2,320 lb.	.10	.10	
12. 12-in. vitrified pipe	65 l. f.	1.25	2.00	
13. Bitum. concrete pavement	1,140 s. y.	1.75	3.00	
14. Asphalt pavement	50 s. y.	2.50	2.75	
15. Broken stone	750 c. y.	3.50	5.50	
16. Unclassified work	Lump Sum	6,875.00	5,400.00	7,000

HIGHWAYS, TENNESSEE

OWNER: Tennessee Dept. of Highways and Public Work Nashville.

PROJECT: Improving 7.407 miles of State Route 9 fro Knoxville City Limits to Anderson County Line, in Kn County, Tenn. Involves necessary clearing and grubbin roadway, channel and drainage excavation; 8-in. plain cem concrete pavement; gutter; rubble stone riprap; pipe culve 15 to 30-in.; moving ten buildings; and construction of re forced concrete bridge. Project designed to double tra capacity out of Knoxville.

CONDITIONS: Contractor to furnish all materials and co plete work in 150 working days. Rail and highway transpo

(*Continued on page* 101)

HIGHWAYS, TENNESSEE

(*Continued from Page 98*)

...tion facilities available. Labor shortage in area at present time, and it is anticipated that a large percentage of the required common labor will have to be shipped in. Wage rates specified are: skilled labor, $1.00 to $1.50 per hour; semi-skilled, 75 to 87½c.; and common, 55 to 75c.

BIDS: Four bids were received June 16, 1944, ranging from the contract low of $600,978 to $853,028.

LIST OF BIDDERS:

1. Foster & Creighton Co., Nashville, Tenn. (contract) $600,978
2. Stacy Bros. Co., Johnson City, Tenn 699,631
3. H. E. Wolf Constr. Co., Inc, and J. B. Michael & Co, Memphis, Tenn 780,039
4. Harrison Constr. Co., Pittsburgh, Pa 853,028

Roadway

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing and grubbing	Lump Sum	$7,560.00	$5,000.00	$17,103.50
2. Road and drainage excav. (uncias.)	263,018 c. y.	.32	.58	.70
3. Channel excavation (unclass.)	2,748 c. y.	2.00	1.25	3.75
4. Culvert excavation (unclass.)	8,942 c. y.	.50	1.25	.70
5. Crushed stone, tr. bd. rdway.	15,778 c. y.	3.00	3.50	2.98
6. Con. conc. pavmt., plain (8-in. uniform)	114,711 s. y.	2.40	2.57	3.06
7. Class A concrete	728.2 c. y.	40.00	35.00	35.00
8. Class B concrete	180.7 c. y.	40.00	35.00	35.00
9. Steel bar reinforcing	80,522 lb.	.06	.07	.06
10. Remove, relay concrete pipe	76 l. f.	1.70	1.00	4.30
11. Concrete gutter	631.3 c. y.	26.00	20.30	27.80
12. Markers (rt.-of-way posts)	160 ea.	3.50	4.00	3.00
13. Rubble stone riprap (plain)	160 c. y.	20.00	20.00	15.00
14. Water for embankment	5,286 M gal.	1.50	2.00	1.00
15. 15-in. pipe culvert (side-drain)	400 l. f.	2.00	1.75	2.25
16. 18-in. pipe culvert (side-drain)	922 l. f.	2.25	2.25	2.91
17. 24-in. pipe culvert (side-drain)	142 l. f.	3.50	3.20	4.60
18. 18-in. pipe culvert	3,151 l. f.	2.25	2.25	2.91
19. 24-in pipe culvert	751 l. f.	3.50	3.20	4.60
20. 30-in. pipe culvert	306 l. f.	5.00	4.50	6.16
21. Moving ten buildings in various locations	Lump Sum	25,475.00	22,010.00	14,950.00

Bridge

22. Removal of specified portions of existing structures	Lump Sum	$3,000.00	$6,000.00	$1,500.00
23. Dry excavation	840 c. y.	2.25	2.00	5.00
24. Wet excavation	304 c. y.	10.00	15.00	10.00
25. Rock excavation	545 c. y.	10.00	15.00	12.00
26. Class S concrete	10 c. y.	100.00	60.00	100.00
27. Class A concrete	983.2 c. y.	42.00	38.00	41.00
28. Class B concrete	100 c. y.	42.00	32.00	41.00
29. Steel bar reinforcing	130,814 lb.	.06	.07	.06
30. Rock drilling	72 l. f.	.75	1.50	1.75

WATER SUPPLY SYSTEM BIG SPRING, TEXAS

OWNER: City of Big Spring, Tex.; Freese & Nichols, Fort Worth, engineers.

PROJECT: Construction of water supply system for city of Big Spring, Tex., including the developing of eight water wells, both straight wall wells and gravel pack water wells (Contract 1); furnishing and installing eight water well pumps and appurtenances (Contract 2); and construction of water supply main and well collecting system (Contract 3).

CONDITIONS: Contractor to furnish all materials and complete each of the three contracts in 70 days. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.12½ to $1.50 per hour; semi-skilled, 60c. to $1.00; and common, 50c.

BIDS: Five bids were received on Contract 1, three on Contract 2, and fourteen on Contract 3. Awards in each case were made to the low bidder. Bids on Contracts 1 and 3 were opened June 19, 1944, and on Contract 2 on June 7, 1944. Tabulation of bids of the three low bidders and the complete list of bidders is given below.

Contract 1—Developing Water Wells

LIST OF BIDDERS: (Opened June 19, 1944)

1. George L. Taylor, Plainview, Tex. (contract) $37,887
2. Alide Wells Co., Denver, Colo 39,368
3. Kent & Preston, Fort Worth, Tex 41,289
4. J. B. Ewing, Big Spring, Tex 43,587
5. Layne Texas Co., Ltd., Dallas, Tex 47,062

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Straight wall well No. 1	1 ea.	$2,277.14	$2,645.72	$2,550.00
2. Gravel pack water well No. 2	1 ea.	3,441.38	3,426.72	3,400.00
3. Gravel pack water well No. 4	1 ea.	5,331.73	5,456.88	5,954.00
4. Gravel pack water well No. 7	1 ea.	4,991.63	5,010.72	5,200.00
5. Straight wall well, selected location	1 ea.	3,226.90	3,600.72	3,500.00
6. Gravel pack well, selected location	3 ea.	5,052.34	4,702.72	5,100.00
7. Additional depth, str. wall well	50 l. f.	6.00	10.00	10.00
8. Additional depth, gravel pack well	150 l. f.	12.90	17.50	15.00
9. Additional length, screen	160 l. f.	2.10	2.50	3.00
10. Rat hole	250 l. f.	2.35	4.00	6.00
11. Additional developing time	50 hr.	3.00	6.00	8.00
12. Additional 24-hr. flow test	1 ea.	108.00	144.00	150.00
13. Additional 10-hr. flow test	1 ea.	45.00	60.00	75.00

Contract 2—Water Well Pumps, etc.

LIST OF BIDDERS: (Opened June 7, 1944)

1. Layne Texas Co., Dallas, Tex. (contract) $8,554
2. Dean Bell, San Angelo, Tex 9,356
3. Briggs Weaver Machinery Co., Dallas, Tex 9,550

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Pump, motor, starter, etc., Well No. 1	Lump Sum	$1,057.44	$1,200.00	$1,200.00
2. Pump, motor, starter, etc., Well No. 2	Lump Sum	1,057.44	1,150.00	1,150.00
3. Pump, motor, starter, etc., Well No. 4	Lump Sum	1,057.44	1,110.00	1,150.00
4. Pump, motor, starter, etc., Well No. 7	Lump Sum	1,025.94	1,154.00	1,200.00
5. Pump, motor, starter, etc., Well No. 9	Lump Sum	1,057.44	1,110.00	1,150.00
6. Pump, motor, starter, etc., Well No. 10	Lump Sum	1,057.44	1,150.00	1,150.00
7. Pump, motor, starter, etc., Well No. 11	Lump Sum	1,057.44	1,150.00	1,150.00
8. Pump, motor, starter, etc., Well No. 12	Lump Sum	1,057.44	1,200.00	1,200.00
9. 10-ft section of discharge column and pump shaft	4 ea.	31.50	33.00	50.00

(*1*) *Layne pumps.* (*2*) *Pomona pumps.* (*3*) *Peerless pumps.*

Contract 3—Supply Main and Collecting System

LIST OF BIDDERS: (Opened June 19, 1944)

1. Dalton & Cullum, Dallas, Tex. (contract) $454,212
2. M. F. Fisher & Son., San Antonio, Tex 454,585
3. Brown & Root, Inc., Housotn, Tex 483,337
4. N. P. Van Vallenburgh, South Gate, Calif. 486,075
5. Garey W. George Constr. Co., Mobile, Ala. 497,238
6. Oldt-Dellone, Dallas, Tex 498,830
7. Trueheart & Caldwell, San Antonio, Tex 515,702
8. Bailey Meissner, Wichita Falls, Tex 526,548
9. Lipport Bros., Oklahoma City, Okla. 538,890
10. Holland Page, Austin, Tex 555,410
11. C. H. Harrison, Waco, Tex 559,654
12. E. H. Reeder Constr. Co., Dallas, Tex 559,696
13. Thomas Bate & Son, Houston, Tex 561,138
14. Wahrmund & Logan, San Antonio, Tex 612,846

Item	Quan.	Unit Prices (1)	(2)	(3)
1. 18-in. c. i. pipe, Class 100	11,800 l. f.	$3.93	$3.84	$4.00
2. 16-in. c. i. pipe, Class 150	11,200 l. f.	4.10	4.24	4.40
3. 14-in. c. i. pipe, Class 100	57,730 l. f.	3.30	3.28	3.50
4. 14-in. c. i. pipe, Class 150	12,000 l. f.	3.50	3.57	3.70
5. 14-in. c. i. pipe, Class 200	4,000 l. f.	3.75	3.74	3.90
6. 12-in. c. i. pipe, Class 100	2,520 l. f.	2.82	3.00	3.20
7. 10-in. c. i. pipe, Class 100	3,260 l. f.	2.28	2.53	2.75
8. 8-in. c. i. pipe, Class 100	5,000 l. f.	1.80	2.10	2.40
9. 6-in. c. i. pipe, Class 100	400 l. f.	1.36	1.73	2.30
10. Cast iron bell and spigot fittings	7 ton	160.00	190.00	220.00
11. Cast iron flanged fittings	1 ton	250.00	250.00	275.00
12. 16-in. gate valves (AWWA)	3 ea.	200.00	195.00	225.00
13. 14-in. gate valves (AWWA)	7 ea.	155.00	145.00	175.00
14. 6-in. gate valves (AWWA)	8 ea.	35.00	43.00	50.00
15. 14-in. gate valves (150# WP)	1 ea.	135.00	127.00	150.00
16. 12-in. gate valves (150# WP)	2 ea.	87.50	106.00	120.00
17. 10-in. gate valves (150# WP)	3 ea.	70.00	83.00	110.00
18. 8-in. gate valves (150# WP)	4 ea.	50.00	56.00	75.00
19. 6-in. gate valves (150# WP)	4 ea.	32.50	41.00	50.00
20. 6-in. check valves	3 ea.	37.50	42.00	55.00
21. 1-in. corporation cock, drains	9 ea.	5.00	3.00	15.00
22. 2-in air valve assembly	20 ea.	55.00	49.00	60.00
23. 1-in. air valve assembly	2 ea.	27.50	24.00	50.00
24. Air valve manholes	22 ea.	120.00	94.00	200.00
25. Valve boxes for valves 10-in. and larger	20 ea.	8.00	11.00	20.00
26. Valve boxes for valves 8-in. and larger	15 ea.	4.00	7.00	15.00
27. Valve markers	37 ea.	4.00	3.50	4.00

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Association Elections and Activities

N. B. Garver, bridge engineer for the Arkansas State Highway Department, has been elected president of the Arkansas State Board of Registration for Professional Engineers. Other officers are: R. E. Williams, Little Rock, vice president, and Vernon E. Scott, Little Rock, re-elected secretary-treasurer.

The Central States Sewage Works Association has elected these officers: President, W. D. Hatfield, Decatur, Ill.; Vice President, E. J. Beatty, now a captain in the Army; Second Vice-President, P. W. Riedsel, Minneapolis, Minn.; Third Vice-President, Carl Carpenter, Hammond, Ind.; and Secretary-Treasurer, John C. Mackin, Madison, Wis.

The Conference of Wisconsin Sewage Operators, which met in conjunction with the Central States group elected: President, Robert W. Frazier, Oshkosh; First Vice President, H. P. Kakuske, Janesville; Second Vice President, L. A. Manteufel, Wausau; and Secretary-Treasurer, T. F. Wiesnewski, Madison.

The following new officers of the Birmingham, Ala., Engineers' Club, have been installed: Ralph E. Kirk, president; J. H. Adkins, vice president; John T. Denton, secretary-treasurer. S. C. Ebbert, John W. Hager and Ralph Y. McIntyre were elected directors. The club has a membership of 600.

V. L. Leigh has been named president of the Builders' Exchange at Victoria, B. C. G. H. Wheaton is vice-president, W. J. Hamilton, secretary-treasurer, and Walter Luney, J. A. Pollard, H. J. Langdon, A. Davies, J. N. Anderson, G. Ede, F. Hawes, W. Mensizes, C. Bartle and D. Smith, directors.

Officers elected by the county engineers' section of the Iowa County Officers association are: J. W. Wiersma, Grundy Center, president; Ray McMurray, Newton, vice president, and Frank O. Laing, Des Moines, secretary.

E. M. Eastman, of Atlanta, is the newly elected president of the Georgia Branch, Associated General Contractors of America, Inc. Other officers are J. J. Jones, first vice president; P. D. Christian, second vice president; E. K. Van Winkle, secretary, and A. J. Collons, treasurer.

The board of directors consists of Otis A. Barge, Atlanta; J. P. Bradfield, Columbus; Edmund F. Cook, West Point; Carroll Griffin, Atlanta; B. H. Hardaway, Jr., Columbus; C. W. Mobley, Augusta; Arthur Pew, Jr., Atlanta; Cecil H. Ramsey, Atlanta; C. R. Smalling, Macon; J. P. Wey, Atlanta, and W. A. Young, Macon.

Sanford Zeigler, Jr., Fairfield, Ia., was elected chairman of the Iowa Highway commission for the year which began July 1, and S. Ray Emerson, Creston, vice chairman.

John L. Hughes, Benton, Ark., was elected president of the Saline River Valley Flood Control Association organized recently at a meeting of representatives from Saline, Grant, Cleveland, Drew, Bradley and Ashley counties, Ark.

Other officers include John R. Matthews, secretary, and State Senator Lee Reeves, treasurer. The group will sponsor a survey of flood damages in the valley made by engineers and to be presented to the U. S. Engineers and Congress.

N. R. Graham, Tulsa, Okla., a member of the Water Resources Committee of Oklahoma, was elected general chairman of a temporary executive committee of the Arkansas Basin Flood Control Committee, an organization formed in Russellville, Ark., recently.

Other members of the committee which will organize numerous soil conservation and flood control committees in localities along the basin are: Mike Mayers, Van Buren, vice chairman; T. L. Green, Ft. Smith, secretary-treasurer; Ezra Bears, Wichita, Kan., Don McBride, Oklahoma City, Okla., Reece Caudle, Russellville, and R. A. Kern, Little Rock, members.

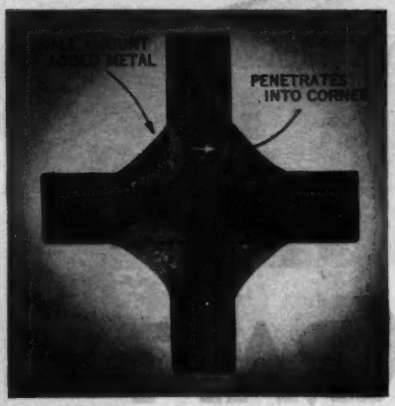
Lieut. Col. N. J. Riebe, Army district engineer, has been elected president of the Buffalo, N. Y., Post of the Society of American Military Engineers. Other officers are Capt. Charles A. Voltz, vice-president; Capt. R. M. Williams, secretary-treasurer; William A. Miller, assistant secretary-treasurer, and Col. William Kelly, Maj. Nelson Stone and Capt. Carl Wicker, directors.

Lieut. Col. C. C. Lindsay, chairman of the Montreal branch of the Engineering Institute of Canada, has been elected president of the Corporation of Professional Engineers of Quebec. Others elected were: P. E. Poitras, vice-president; A. D. Ross, secretary-

A War Measure of First-Class Magnitude"...he says

CONVENTIONAL WELDING

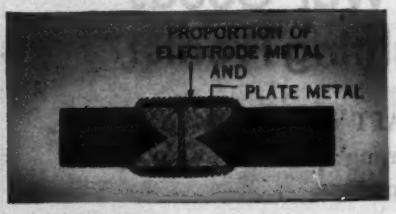
"FLEET-WELDING"



TYPICAL FILLET WELDS

STRENGTH:	Stronger than plate
SPEED:	5" per min.
COST:	100%

STRENGTH:	Stronger than plate
SPEED:	12" per min.
COST:	42%



TYPICAL BUTT WELDS

STRENGTH:	Stronger than plate
SPEED:	2" per min.
COST:	100%

STRENGTH:	Stronger than plate
SPEED:	9" per min.
COST:	25%

A Lincoln engineer is available nearby to help you apply "Fleet-Welding" Technique. Write for Bulletin No. 440 which gives complete explanation of the simple technique and the welding procedures.

LOOK, MAHATMA: While you pondered on the magnitude of political measures for winning, Lincoln Engineers were enthusiastically working out a very practical measure that is away out in front in magnitude:

"FLEET-WELDING"

A First-Class Production Measure ... of First-Class Magnitude

This new, revolutionary technique using "ARC-FORCE" to speed the welding of all types of joints in plate, shapes and sheet is bringing back reports of 25% to 75% faster welding . . . also savings in electrode material and power. Cases also are reported where back-chipping and plate beveling are eliminated.

The savings shown at left are typical of this new technique developed by Lincoln engineers.

THE LINCOLN ELECTRIC COMPANY
CLEVELAND, OHIO

America's greatest natural **recourse**

ARC WELDING

SISALKRAFT

The Concrete Curing Blanket That Protects War Goods Enroute to Fighting Fronts!

This picture shows SISALKRAFT in use about four years ago on a concrete job, preventing quick evaporation and protecting the newly poured concrete.

Today, SISALKRAFT is protecting deck loads of equipment, arms, ammunition and other war supplies. In the holds of our merchant marine SISALKRAFT is protecting shipments of medicines, foods and clothing from high humidity, rot and rough handling.

The very same qualities that made SISALKRAFT the Number One concrete-curing agent are the reasons why it now protects supplies enroute to our boys "over there."

Over 24 years of proven dependability, on thousands of concrete jobs, won for SISALKRAFT the distinction of being in the specifications of 40 State Highway Departments. Contractors have used it over and over again — finally, using their "old" SISALKRAFT blankets to protect subgrades and materials.

The war record of SISALKRAFT shows that this scuff-proof, weather-resistant, tough material can take amazing punishment! When Victory is won SISALKRAFT will again be available. Put it *first* on your list for postwar work!

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.

treasurer; A. O. Dufresne, J. A. McCrory, Adhemar Laframboise, Edward A. Ryan and Ernest Lavigne, counsellors.

The Florida Engineering Society has elected J. H. Dowling, Florida state road department engineer, president. Other officers are Ralph E. Wendt, 1st vice president; Capt. Edmund Friedman, 2nd vice president; Raymond Chase, treasurer and W. H. Beisler, Gainesville, secretary.

Hale Sutherland, dean of engineering at Lehigh University, is president of the Pennsylvania Society of Professional Engineers. Other officers are: J. J. Paine, Pittsburgh; Robert V. Hudson, Philadelphia; Samuel Baker, Scranton, and Ritchie Lawrie, Jr., Harrisburg, vice-presidents; Russell S. Conrad, Harrisburg, executive secretary; and Walter E. Witte, Philadelphia, treasurer.

The Quebec Branch of the Engineering Institute of Canada has elected these officers: honorary president; A. R. Decorie, superintendent of the Department of Public Works of Canada; president, E. D. Gray-Donald, chief engineer, Quebec Power Co.; vice-president; J. O. Martineau, assistant chief engineer, Quebec Department of roads; secretary-treasurer; Gustave St. Jacques, engineer Quebec public utilities commission; counsellors for one year; A. E. Pare and Yvon R. Tasse; for two years: Lucien Martin, Walter J. Manning, J. M. Paquet, Philippe Methe, Rene Dupuis, Paul Vincent, and P. E. Gagnon.

Paul R. Speer, district engineer, U. S. Geological Survey, St. Paul, Minn, has been elected president of the northwest section of the American Society of Civil Engineers. Other new officers are Fred T. Paul, city engineer of Minneapolis, 1st vice-president; W. B. Irwin, assistant to the vice-president of the Great Northern Railroad; 2nd vice-president; and Frank S. Altman, district engineer for the Portland Cement Association, Minneapolis, secretary-treasurer.

Robert M. Angus, Jacksonville, Fla., consulting civil engineer, has been appointed by the directors of the American Society of Civil Engineers to a 4-year term on the National Committee on Local Sections.

The Illinois Association of Highway Engineers has elected the following officers: chairman, Earl Guy of Springfield, vice chairman, Wayne Barney of Peoria; Secretary, O. D. Terry of Effingham; and treasurer, William Gaffney of Paris.

It isn't necessary—now—to *over*design to assure adequate safety factors where exact service stresses can't be predicted.

A device as small as your little fingernail, cemented in place on any plane or curved surface, can tell you exactly *what* is happening . . . *at the instant it happens.* Check your test requirements against this list of jobs the SR-4 is doing.

1 Testing structures or machines under steady load conditions

The SR-4 accurately measures static strains down to 1 part in 2,000,000, (Equivalent to 15 lb. sq. in. stress in steel.) and exhibits perfect linearity, even in the plastic range.

2 High temperature testing under steady load conditions

Standard Phenol-resin bonded gages are serviceable up to 500° F and with small loss in accuracy up to 700° F.

3 Testing structures or machines under varying load conditions

The SR-4 handles frequencies ranging from 0 to 30,000 per second, with no loss of linearity.

4 High temperature testing under varying load conditions

No loss of accuracy or sensitivity is entailed. Measurements in the presence of hot oil have been successfully made.

Tests on the production floor or in the field can be made as easily and accurately as in the laboratory. The SR-4 can solve some worrisome problems for you. The Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia, Penna., U. S. A.

No. 165—Torquemeter
No. 169—Portable Strain Indicator
No. 170—Strain Recorder
No. 171—Applications
No. 172—Scanning Recording Equipment
No. 174—Applications to Shipyard Problems
No. 175—Bonded Resistance Wire Strain Gage

BLW HI BALDWIN TRADE

BALDWIN SOUTHWARK TESTING EQUIPMENT

CEMENT GUN COMPANY

"GUNITE" CONTRACTORS

GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.

PRE-STRESSED "GUNITE" WATER TANKS

Shown above is one of two water supply tanks built by us, under direction of Mr. I. M. Glace, Consulting Engineer for the borough of Schuylkill Haven, Pa. The tanks are 80'-0" dia. x 20'-0" high with walls 8" thick and self-supporting domed roof, both built of pre-stressed "GUNITE." The tanks are built with poured concrete floors and footings, and have a capacity of 750,000 gal. each. A unique feature is that half the capacity of each tank is always at the disposal of a large local industrial plant, while the balance is for community use. This is assured by the simple expedient of having the outlets for the latter purpose halfway up the tanks.

Write for our Bulletin 2200 containing descriptions of other water works jobs we have done in "GUNITE," as well as many other kinds of work.

MANUFACTURERS OF THE "CEMENT GUN"

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TUNNEL LINER PLATES

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WATER TUNNELS
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SERVICE TUNNELS
HIGHWAY TUNNELS
CAISSONS
SHAFTS
MINE ROOFS
OVERCASTS

Write for the COMMERCIAL booklet on tunnel construction and methods. It's of real interest to engineers and contractors.

THE COMMERCIAL SHEARING & STAMPING CO.

YOUNGSTOWN 1 OHIO

NEW AIDS TO THE CONSTRUCTOR

Concrete Curing Compound

Daraseal is the name of a new typ concrete curing compound, develope by the *Dewey & Almy Chemical Co Cambridge 40, Mass.*, for many yea manufacturers of TDA, the grinding a used by many cement manufacturer and more recently of Darex, an air-e training agent.

Daraseal is a product of a researc program associated with the company thermoplastic coatings, which are bein successfully used in moisture-proofe fiber containers for Army rations. It claimed to give an efficient, low co continuous transparent film of unifor thickness, that is highly impermeabl and effectively eliminates water a moisture vapor losses from new concre surfaces. It is a blend of hydro-carb waxes combined with non-waxy mat rials, which inhibit segregation an favor continuity and impermeability the film.

Daraseal is said to have been designe with a true appreciation of the prin iples of plastic flow, so that it can b applied to rough or smooth horizont or vertical surfaces with the assuranc of obtaining a uniform film of any pr determined thickness in a single appl cation. When sprayed on, it hits th surface and stays there without appreci able flow. Results of extensive tests ha indicated that Daraseal at seven days 95 percent efficient in retaining moistu at 30 percent relative humidity and 9 deg. F. temperature, at a coverage 200 sq. ft. per gal.

• • •

Dual-Purpose Lift Truck

With a forward or backward worki speed of 12 mi. per hr., a new dua purpose Hyster "75" lift truck handl

short-distance transportation and stac ing and tiering problems. This truc

TOUGHNESS like this prevents destruction like this

AFTER 30 BLOWS OF 70 FOOT POUNDS EACH

-specify JENKINS AIR FURNACE MALLEABLE IRON VALVES

For the services in which valves must take unusual punishment, but where pressures and temperatures are not high enough to require steel valves, Jenkins now offers Air Furnace Malleable Iron Valves.

These new valves effect a two-way saving. Their first cost is considerably less than that of carbon steel valves, even though they compare favorably in strength and impact resistance. Also, they save by eliminating costly valve breakage and service interruptions.

Next time you order valves for use *where steam pressure does not exceed 150 pounds, and where temperature is not above 450°F.*, check service conditions closely. If the valves will be subject to destructive shocks and strains, or corrosion, specify Jenkins Air Furnace Malleable Iron Valves.

WRITE FOR BULLETIN No. 193 and specification sheets, which describe the complete line of Globe, Angle, Gate and Check patterns, sizes 2" to 6". Write to Jenkins Bros., 80 White Street, New York 13, N. Y.

Malleable Iron survives this brutal test without fracturing

The wedge test is convincing proof of the toughness and shock-resistance of Malleable Iron, and shows why Jenkins Valves stand up under valve-torturing service. The Malleable Iron Founders Society describes the test as follows:

"The wedge used is 1" wide and tapers from ½" thickness to ⅛" in a length of 6". The specimen is tested as cast. A small drop hammer weighing 21 lbs. is dropped on the tip from a height of 3.33 ft. Each blow is equivalent to 70 ft. lbs."

COMPARE	TENSILE STRENGTH	SHOCK RESISTANCE: YIELD POINT	SHOCK RESISTANCE: ELONGATION IN 2 INCHES	TEMPERATURE LIMIT	CORROSION RESISTANCE Relative	VALVE COST Relative
ASTM 126-30 CAST IRON	34,000 lbs. per sq. in.	0	0	to 450°F		
ASTM 47-33 AIR FURN. MALL. GRADE 35018	53,000 lbs. per sq. in.	35,000 lbs. per sq. in.	18%	to 450°F		
ASTM 95-36 CARBON STEEL	70,000 lbs. per sq. in.	36,000 lbs. per sq. in.	22%	to 750°F		

Only top-grade *Air Furnace* Malleable is used for Jenkins Valves

...gest of all types of Malleable Iron is Air Furnace Malleable. Top-rated grade is ...Furnace Standard Specification ASTM-... Grade No. 35018 . . . used by Jenkins.

...Jenkins Air Furnace Malleable Iron Valves meet standards of U. S. Maritime Commission, and the Bureau of Marine Inspection and Navigation, U. S. Coast Guard.

High Corrosion Resistance—Air Furnace Malleable Iron Valves resist corrosion better than carbon steel or cast iron valves. This advantage, plus high impact resistance, recommends these valves for marine, petroleum, mining, and various chemical and industrial services.

Fig. 1101
Inside Screw, Bronze, Bolted Bonnet Gate

JENKINS VALVES

SINCE 1864

For every industrial, engineering, marine and plumbing-heating service . . . in Bronze, Iron, Cast Steel and Corrosion-Resisting Alloys . . . 125 to 600 lbs. pressure.

Jenkins Bros., 80 White Street, New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago. Jenkins Bros., Ltd., Montreal, London.

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THOMPSON

POWER SPRAY MACHINE

Series 300—For Use in Curing Concrete Roads

PRICE COMPLETE
$395.00
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Write for Complete Instructions on Proper Spraying for Concrete Curing and Machine Specifications

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CONSTRUCTION MATERIALS AND EQUIPMENT

BIG JOBS AHEAD

for YOU...
with JACKSON VIBRATORY HAND SCREED!

But before you tackle the big Post-War concrete contracting jobs, get acquainted with the wide scope in concrete surfacing operations offered by the JACKSON SC-4A vibratory hand screed. Its advantages include lightweight, uniform vibration and adaptability to reasonable widths of section. Gives complete puddling to low-water content concrete. Write for further details.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

can turn in its own length of 117 in. and has an overall width of 60 in.

Streamlined, comfortable for the operator, and with conventional automobile controls, the unit operates on three large pneumatic tires, and can climb inclines when fully loaded. On standard models, the lift height is 10 in. from the ground.—*Willamette Hyster Co., Portland 8, Ore.*

• • •

Hose Clamp

Engineered for application without injury to hose or flexible coupling, a new Punch-Lok hose clamp ranges from ¾ in. to 48 in. inside diameter. Once the clamp is locked, it is claimed, neither

vibration nor rough handling can loosen it.

In making a connection, a broad, flat galvanized steel band is double-wrapped around the joint. After tensioning with a pull of 1,000 lb. within a special locking device, the ends are securely locked together under tension; excess band is cut off flush with the clip, so that the joint is streamlined for safety.—*Punch-Lok Co., 321 North Justine St., Chicago 7, Ill.*

• • •

Circuit Breaker Scatter Box

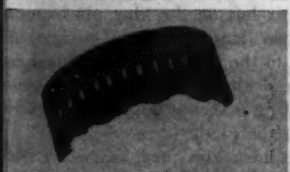
Useful for locations where a number of temporary circuits must be set up and torn down quickly, a new scatter box controls temporary power and light

circuit through a central unit protected by circuit breakers. This scatter box is built for four to eight circuits, with

"MORE THAN 10% INCREASE IN GASOLINE MILEAGE!"*

Ring-Free removes carbon. Keeps pistons clean, rings free. Reduces power loss.

Ring-Free's high film strength and long cling make bearings last longer, even under overloads.



Ring-Free holds foreign particles in suspension . . . stops sludge formation, reduces part clogging.

You'll move more tons of material per gallon of fuel consumed if you use Macmillan Ring-Free Motor Oil. That is a simple statement of fact, and the reasons are very easy to explain.

It takes *power* to move material. It also takes power to *overcome internal engine friction.* The more internal friction is reduced, the more power you'll have for hauling material, or other productive work.

Ring-Free Motor Oil cuts friction-power-loss materially, because it *reduces friction fast.* It lubricates better because it removes carbon, has high film strength, long cling and thorough penetration.

*TESTED AND PROVED ON THE JOB

Operators everywhere find their engines run better and last longer when lubricated with Ring-Free. Power is increased, shut-downs and repairs are decreased. Operating and maintenance costs go down, production and profits go up.

You, too, will notice *immediate improvement* when you change to Ring-Free. Give it the hardest tests you can, on your toughest jobs. It will effectively answer many of your difficulties.

"For the past seven years I have been using Ring-Free Motor Oil in my fleet. I get from seventy to eighty thousand miles before changing motors or being forced to make any major repairs. I never have any sticky valves and but slight traces of carbon, and my gasoline mileage has increased more than ten per cent."

Henry J. Schafer, Jr., Pres.
Schafer Brothers Trucking Corp.

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION

50 W. 50th St., New York 20, N. Y.; 624 S. Michigan Ave., Chicago 5, Ill.; 530 W. Sixth St., Los Angeles 14, Calif.

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So that's one of those bigger pay leads the crane man swears by!
HAISS Hi-Power Digging Buckets in one recent competitive test showed 40% better efficiency than the next best—due largely to superior design of its slewing gear. It pays to say "Haiss"
HAISS
DIGGING BUCKETS

GEORGE HAISS MANUFACTURING CO., INC., 140th St. & Rider Ave., New York 51, N.Y.

Bucket agencies throughout the country. Write, wire for prices, delivery or catalogs.

- WATERWORKS
- INDUSTRIAL PLANTS
- FILTRATION PLANTS
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FOR GENERAL CONTINUOUS DUTY

PUMPING SERVICE

TYPES — Single stage, single suction, sizes 2" and 3". Single stage, double suction, sizes 2½" to 42". Capacities up to 60,000 G.P.M.

SPLIT CASE DESIGN — For easy accessibility. Available in either cast iron, chrome iron, cast steel, bronze, monel and other alloys.

IMPELLER — High efficiency design. Made of cast bronze. Also available in KA-2 stainless steel, cast carbon steel monel or other alloys.

DRIVE UNITS — Pumps can be supplied with dual drive hookup. Electric motor and steam turbine. Electric motor with gas engine. Twin pumps also available with one electric motor.

FREE DATA BOOK. Write on your business letterhead for FREE data book and catalog. Address: DAYTON-DOWD Company, Dept. E-10, Quincy, Illinois.

DAYTON-DOWD

Turbine Pumps • Centrifugal Pumps

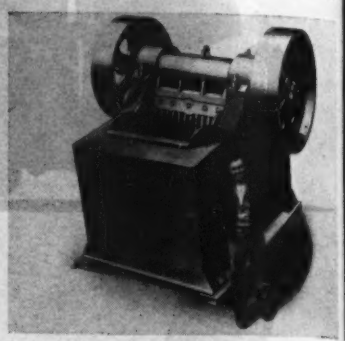
or without neutral.

This device has a hinged cover, with openings for plug receptacles similar to Hubbel No. 7557-G. One 1-in. knockout in each end is included, and the box has a pair of ears for hanging. —*Square D Co., Switch and Panel Division, 6060 Rivard St., Detroit, Mich.*

• • •

Welded Plate Jaw Crusher

Though lateral and transverse ribbing and heavy plate side walls impart necessary structural strength to a newly developed jaw crusher, it has no excess weight. Now available with a 30x42-in. or a 20x36-in. feed opening,



this crusher uses four SKF roller bearings, which are labyrinth sealed against grit and grease.

Each revolution of the eccentric shaft produces two distinct crushing blows—the primary blow at the top of the jaws, and the secondary stroke at the bottom. —*Universal Engineering Corp., Cedar Rapids, Iowa.*

• • •

Double Trunnion Tilt Dozer

A new cable-controlled side-lift bulldozer-trailbuilder features single king pin mounting of the moldboard and double trunnion tilting. The rugged moldboard can easily be angled to the right or left on the king pin by removing two landside pins, swinging the blade to the desired side, and replacing the landside pins. The double trunnion mounting makes it possible to tilt either end of the blade 12 in.

The horn and push frame are fabricated from heavy steel welded box-beams; welded v-shaped vertical braces and heavy steel plate horizontal cross pieces reinforce the blade. Moldboard is fitted with reversible cutting edge and replaceable corner bits.

The dozer is track mounted with the weight evenly distributed over the crawler shoes to provide maximum traction, and is powered by single or double drum Buckeye power control units.—*Buckeye Traction Ditcher Co., Findlay, Ohio.*

MANUFACTURERS' ACTIVITIES

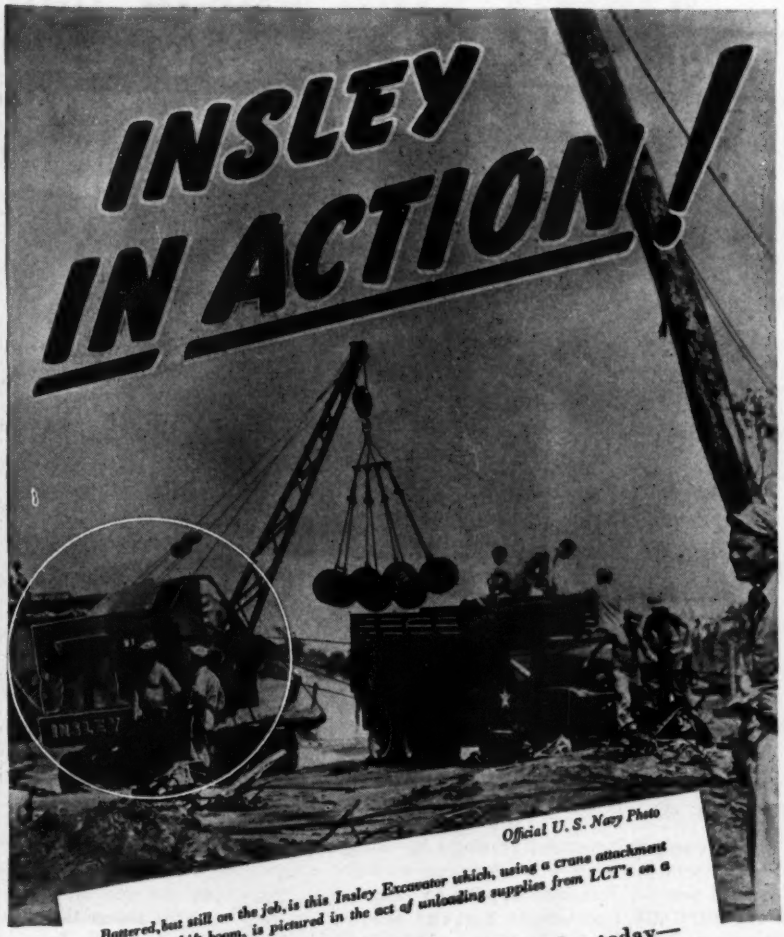
EN ALEXANDER, 49, of Chicago, president of Masonite Corp., died July 6 in chester, Minn. Alexander was ading authority timber in the ited States. His iness career rted in 1920, en he became ociated with the er Falls Timber Co., Silverton, . In 1923 he t with the Wausau Paper Mills, kaw, Wis. In 1926, he joined the lter Alexander Co., Wausau, Wis. A ector of the Masonite Corp. since its anization, he became president in 0. Mr. Alexander spent almost his ole life in the lumber, timber, paper l associated products industries. om 1942 to 1943, he served in Washton with the War Production Board, coming chief of the lumber section.

H. C. PETERS, of the T. L. Smith Co., lwaukee, Wis., has been promoted to istant to the president and vice president in charge of engineering, research d development.

The new general sales manager for the L. Smith Co. is Robert P. Bremner o, until recently, was district manager in Milwaukee for the Petoskey rtland Cement Co. Mr. Bremner had en with Smith for several years as a mber of the sales department.

THE 100,000TH SERIES 71 6-cylinder cycle diesel engine manufactured by e Detroit diesel gine division of neral Motors rp., was dedited recently to ank Knox, late cretary of the vy, by W. T. rowe, general nager of the mpany. The wer plant was esented to the U. S. Navy by C. F. ttering, vice president of General otors Corp. and was accepted for the med forces by Rear Admiral H. G. aylor.

A celebration in honor of the dedication and delivery of the engine was wit-



Official U. S. Navy Photo

Battered, but still on the job, is this Insley Excavator which, using a crane attachment and make-shift boom, is pictured in the act of unloading supplies from LCT's on a South Pacific shore.

Wherever you find Insley Excavators in action today—and that includes every fighting front—you will find *fast action!*

Speed—far faster swings and dumps—has always been an outstanding feature of Insley equipment and this is one important reason why Insley's entire production is now going to the armed forces . . . because speed is the essence of victory.

After victory, when we are again able to provide Insley Excavators for your dirt moving and material handling jobs, you'll find that Insley's faster work cycle will be a vital asset . . . because speed, when it is backed with Insley's proved economy and dependability, is the essence of profitable performance.

EXCAVATORS • CRANES • BUCKETS • CARTS

INSLEY

CONCRETE PLACING EQUIPMENT

INSLEY MANUFACTURING CORPORATION

INDIANAPOLIS 1, INDIANA.

weighs less... digs more!

Lightweight

Here's how you can step up your yardage . . . move *more material* and move it *faster* . . . with your present machines, regardless of their *normal* capacity.

You can get increased yardage by using a larger bucket than that for which your machine was designed without exceeding the allowable loaded weight. This also applies to long boom operations. *But* you must have HENDRIX Lightweight Buckets! They're lighter . . . we've taken the load out of the bucket itself, to enable you to put bigger loads inside. In wet digging, you get an extra bonus pay load every trip by leaving the water in the pit. HENDRIX Lightweights give you strength, toughness, durability, plus many inbuilt features designed to increase your "digability."

- 20% to 40% lighter than other buckets, type for type.
- Manganese steel chains, fittings and reversible tooth points.
- All Welded construction . . . for greater strength and durability.
- Gets full load pay material every trip . . . even in wet digging.
- 3 types—light, medium and heavy duty—⅜ to 20 cu. yds.

WRITE FOR DESCRIPTIVE LITERATURE
. . . OR ASK YOUR DEALER

HENDRIX Lightweight DRAGLINE BUCKETS

DeSoto Foundry, Inc.—Mansfield, Louisiana

nessed by Detroit diesel employees as they pledged to buy war bonds in an amount equal to the purchase price of an LCI boat.

Also participating in the dedication and war bond pledge were R. K. Evans, vice president of the General Motors Corp.; V. C. Genn, sales manager of Detroit Diesel, Frank Isbey, head of Detroit's war loan drive, and James Fargo, union representative.

JOHN F. JOHANNSEN has been named export manager for the Hyster Co., Portland, Ore. and Peoria, Ill. Export manager for R. G. LeTourneau, Inc. for the past fourteen years, Mr. Johannsen has visited 85 foreign countries. He spent several months in Australia in 1942 establishing a manufacturing plant. Most recently he has been in Washington, D. C., with the International Branch, Office of the Chief of Engineers, U. S. Army.

Manufacturers of winches, hoists, and cranes for use with Caterpillar track-type tractors and a complete line of self-propelled pneumatic-tired industrial trucks, including the straddle trucks now in use extensively in ship building, the Hyster Co. will expand its export program to complete coverage.

THE TIMKEN ROLLER BEARING CO., Canton, Ohio, has organized a South American subsidiary in anticipation of accelerated industrial growth in South America after the war.

Whitley B. Moore, general manager of sales says that after the war the Timken Roller Bearing Co. of South America would handle the servicing of Timken bearings already in use there, and the engineering development of Timken products in the Latin-American countries.

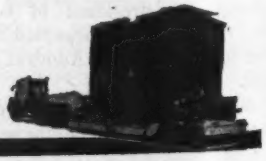
on ROGERS TRAILERS

TODAY even airplanes "bum a ride" on ROGERS TRAILERS. Deck houses for Victory ships . . . huge coastal defense guns . . . giant tanks, all are speeded towards completion and rushed to the fighting fronts on ROGERS TRAILERS.

In War and in Peace ROGERS TRAILERS have proven their ability to "deliver the goods". New models which will be available when war contracts are completed will be even better-engineered . . more efficient than the thousands which have been used successfully by industry for many years.

ROGERS BROS. CORPORATION
ALBION,
PENNA.

EXPERIENCE builds 'em
PERFORMANCE sells 'em



OVER 100,000 HEAVY DUTY TIMBER STRUCTURES BUILT WITH TECO CONNECTORS

Swinging two 120' Timber Hanger Trusses into place. These TECO connectored trusses assembled and erected by Timber Services Incorporated, Detroit, Michigan.

From coast to coast and from the Gulf to Alaska—the evidence is everywhere—that the TECO connector system of timber construction has solved many tough building problems.

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Architects, engineers and designers working on postwar plans are invited to consult the nation-wide timber fabricators who have had practical experience with clear span Roof Trusses, Bridges, Heavy Structural Framing, Barges, Towers, Power Lines, Glued Laminated Construction and Prefabricated Housing.

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The research and engineering staff at TECO headquarters is at your service too—between us we can solve your timber problems.

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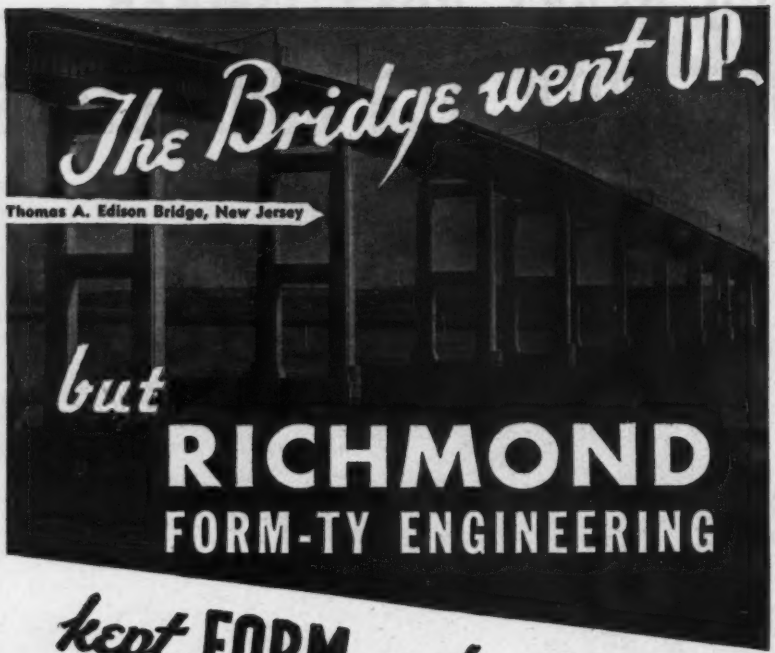

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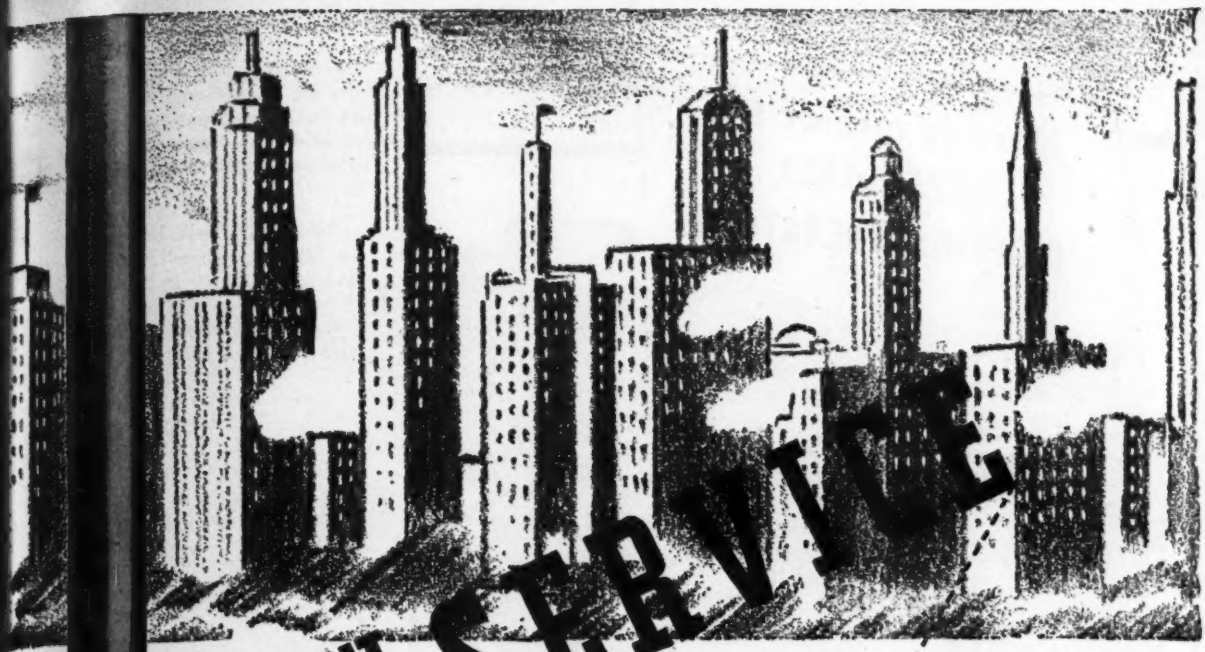
Welding Fitting Dimensions—A new maritime fittings catalog contains dimensional data on seamless wrought steel and wrought iron fittings. A second section gives similar coverage to wrought carbon molybdenum alloy steel. The catalog is fully indexed and has cross section illustrations of each fitting.—*Tube Turns, Louisville, Ky.*

Machines and Machine Tools—A comprehensive catalog of machines, machine tools, and cutting tools has recently been issued in both Spanish and Portuguese by a group of machine and tool manufacturing companies, all located in the Detroit, Mich., industrial area. The catalog is laid out in sections, devoted to the products of the Genesee Tool Co., Fenton, Mich., and of these Detroit companies: Michigan Tool Co., 7171 East McNichols Road, Detroit, 12; Colonial Broach Co., P. O. Box 37, Harper Station, Detroit, 13; Detroit Tap & Tool Co., 8432 Butler Street, Detroit 11; Tungsten Carbide Tool Co., 2661 Joy Road, Detroit 6; Colonial Bushings, Inc., and the New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7.

Valve Do's and Don'ts—Eleven good tips on the handling and care of valves are graphically illustrated in a new 11x7-in. "Do's and Don'ts" chart, which points out the common mishandlings that often reduce valve life. It is illustrated by graphic sketches portraying the right and wrong way to handle each situation. It is excellent for new or old users of valves.—*Reading-Pratt & Cady Division of the American Chain & Cable Co., Inc., Bridgeport, Conn.*

Increasing Panelboard Efficiency—A 16-page pamphlet describes a method of converting obsolete and inadequate electric light and power panelboards to full efficiency without disturbing the box or conduit. The booklet is illustrated with before and after illustrations accompanied by a brief history of each case.—*Square D Co., 6060 Rivard Street, Detroit 11, Mich.*

Luminescence—A booklet gives a clear picture of luminescence by discussing in simple language the charac-



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STREAMLINE Copper Pipe and Solder Fittings combine the non-corrosive qualities of copper and bronze with the most modern and reliable method of water service installation on the market.

Rustable piping, which has been in service for a number of years, may outwardly still appear to be in fair condition, but it is almost a certainty that the walls of the pipe, in many places, have been so reduced by corrosion, that it is only a matter of time until failure occurs. More than that, the conducting area of the pipe has, in the great majority of cases, been greatly reduced by the accumulation of slime and corrosion.

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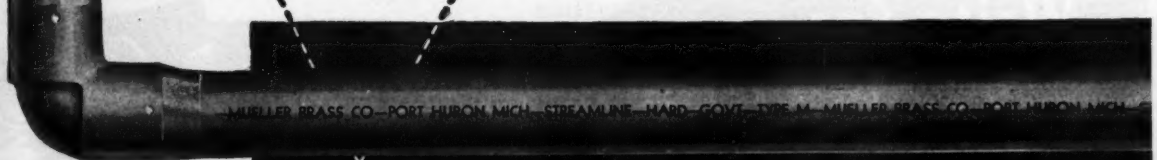
STREAMLINE Copper Pipe and Fittings are at present used 100% for war purposes, but it is not too early to plan again for their peacetime use in the near future when they will again be available.



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The Mueller Brass Co., Port Huron, Michigan were the first to originate Copper Service Pipe in America. This product has always been made by this company at Port Huron, Michigan. For identification purposes the pipe is marked every few inches throughout its length as illustrated here.

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mountings and sizes of outfits available for the engineering and construction trade. It also illustrates some of the applications of compressed air for construction work.—*Schramm, Inc., West Chester, Pa.*

Tarvia—The war has taken toll of our highway system. Numerous routes have been battered by heavy truck traffic and need repair and maintenance now if traffic essential to the war is not to bog down. A new surface on the top of the old road will often strengthen it sufficiently so that it will carry the traffic in a satisfactory manner. Widening will also relieve the stress on a highway by encouraging vehicles to travel over the greater width and thus spread the load over a larger area. Adequate maintenance, resurfacing and widening methods are described in this booklet. —*The Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.*

Bucket Loaders—A 24-page, well illustrated catalog with a 12-page supplement tells the whole story of bucket loaders which excavate, rehandle, strip and load. They are designed to dig anything a workman can shovel without first picking—sand, gravel, broken stone, cinders, coal, coke, etc.—*George Haiss Mfg. Co., Inc., 141 St., Canal Place, Park & Rider Aves., New York 51, N. Y.*

Lubrication of High-up Bearings—Elimination of the hazards due to the manual lubrication of high-up and hard-to-get-at bearings on presses, cranes and other "off the floor" types of equipment is the subject of an illustrated bulletin just issued. It explains the application of a system for sending lubricant under pressure from a central pumping unit to every bearing on the machine. The dangers of personnel accidents, as well as shutdowns caused by faulty lubrication by hand, are contrasted with the safety and certainty said to be obtained through this method. —*The Faral Corp., Cleveland, Ohio.*

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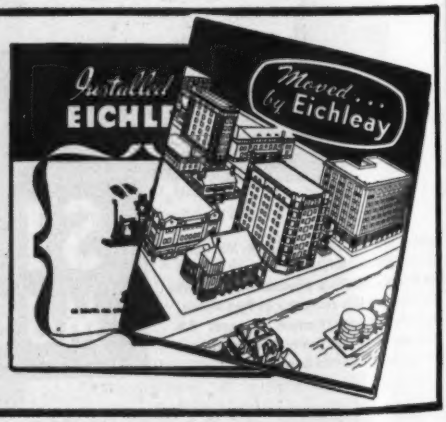

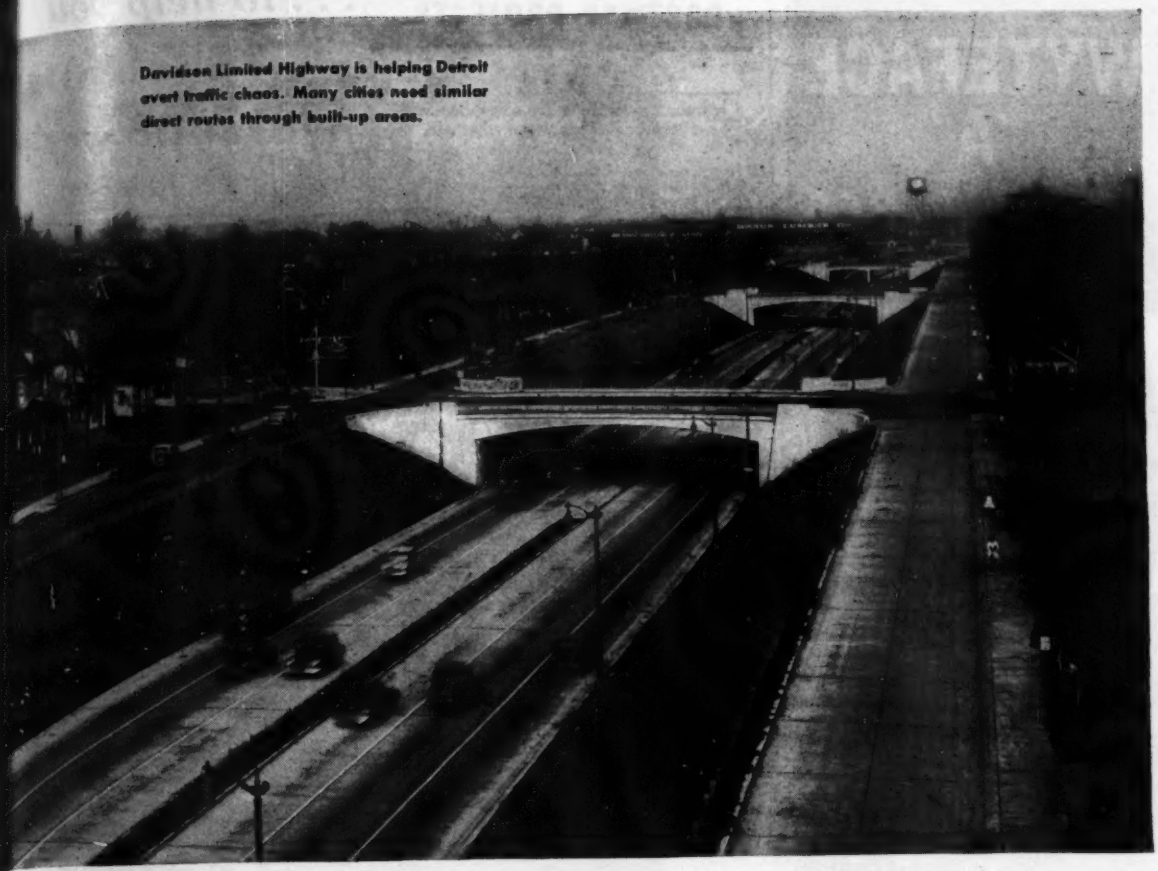

Davidson Limited Highway is helping Detroit avert traffic chaos. Many cities need similar direct routes through built-up areas.

Urban Expressways Call for CONCRETE

Many cities are now making comprehensive plans for redesigning their street systems to include expressways which will reduce accidents and handle traffic in congested areas at minimum cost.

Urban expressways and heavily traveled streets to carry, economically, the increased volume of postwar traffic, must be built of a long-lived material. Concrete has the strength and stamina to carry the heaviest traffic safely at low annual cost.

Concrete construction conserves motor tax money. Not only is the first cost of concrete pavement less than for other pavement of equal load-carrying capacity, but the annual surface maintenance cost is less.

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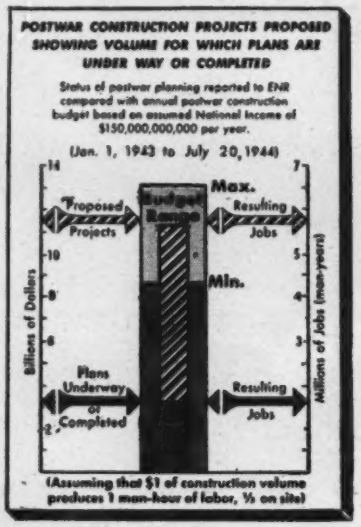
POSTWAR PROJECTS



Projects proposed for postwar construction have been published in these columns since January, 1943 as they have been reported to ENGINEERING NEWS-RECORD.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

WATER SUPPLY

★**Conn., Shelton**—Bridgeport Hydraulic Co., 835 Main St., Bridgeport, water sys. expansion, dam, reservoir, feeder pump. station for Trap Falls Reservoir, Wells Hollow, **$1,000,000.** Land rights not cleared.

★**D. C., Wash.**—Dpt. Sanitary Engineering, District Bldg., Fort Dupont water tank, **$240,000**; Bryant St. pumps, **$350,000**; water meters and parts, **$30,000**; cleaning and lining mains, **$250,000**; main construction, 1st High-11th and M N.W. St. to 4 and M N.E. Sts., **$260,000**; Anacostia Gravity-Minn. Ave. from Pa. Ave. to Benning Rd., **$275,000**; Anacostia 1st High-Minn. Ave. and Benning Rd. N.E. to vic. Southern and Eastern Aves., **$375,000**; 4th High-44 and Lowell Sts., to Wis. Ave. and Woodley Rd., **$105,000**; 1st High-11 and B. N.E. to 16 Sts. and Benning Rd. N.E., **$120,000**; 2nd High-14 and Otis Sts. N.E. to Bladensburg Rd. and D.C. line, **$260,000**; 2nd High-44 and Upton Sts. N.W. to Reservoir Rd. and Ariz. Ave., **$400,000**; 2nd High-Bryant St. pump. station to Harewood Rd. and Taylor St., **$352,000**; 2nd High reservoir (Fort Totten) **$495,000.** CD 1/27—ENR 2/10.

Ill., Brimfield—City, City Hall, plans 90% completed, new water distr. sys., incl. new lake and dam, **$80,000.** Financing not yet provided for. Austin Eng. Co., 115 S. Jefferson St., Peoria, consult. engr.

★**Ill., Galesburg**—City, City Hall, plans underway impounding reservoir for future water supply, water to go thru water softening and treatment plant, water pipe and equip., **$900,000**; sketch plans underway elevated water tank at East Brook St. Fire Station, **$175,000**; Stanley Engr. Co., Muscatine, Ia., consult. engr.; imprv. urban area east of city, watermains, sewers, etc., **$84,000.** A. O. Nordhielm, city engr. Alvord, Burdick & Howson, archts., 20 North Wacker Dr., Chicago, made preliminary surveys in 1934.

Ill., Hanna City—City, plans 90% completed new water distr. sys., incl. lake and drain, **$80,000.** Financing not yet provided for. Austin Eng. Co., 115 S. Jefferson St., Peoria, consult. engr.

★**Ill., Harrisburg**—City, plans 50% completed, constructing lake and pipeline 9¼ mi. long, and 32,000 ft. distr. mains. **$500,000.** R. D. Brown, supt. Hys., Harrisburg, consult. engr.

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Editor-in-Chief, C. V. DAVIS
Project Engineer, Fontana Dam, Tennessee Valley Authority

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For since America entered the war there have been very few new trucks. It's been up to the man in the shop to keep the available supply of trucks on the job. Because of him, vital transportation schedules have been maintained. Food and fighting gear get there by truck, *on time!* A mighty important job. And he's doing it!

The men of International Truck Service *—the nation's largest company-owned truck service organization—*are busier and more alert than ever, now that they're in wartime service. No matter what your make or model of truck, let the truck-trained men of International Service add that vital *extra* mileage to your trucks and keep them rolling on the road to Victory!

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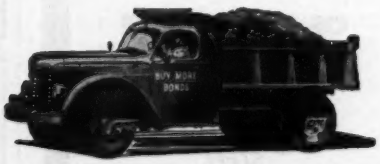

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POSTWAR PROJECTS (Cont'd.)

★**Ill., Mattoon**—Mattoon Water Dpt., J. Goetz, engr., 12 and Marshall Sts., under ground water survey now being made by Illinois State Geological Dpt., Champaign, addnl. source of supply. Over $400,000; plan water plant imprvs., covering clear well for of 12 St., $25,000; 500,000 gal. elevated tank at site of City Bldg., $50,000.

Ill., Quincy—City Water Comn., Hampshire St., plans completed water treatment plant increasing filtering capacity $120,000. Alvord, Burdick & Howson, 20 Wacker Dr., Chicago, consult. engrs.

La., Abbeville—Town, plans 90% completed 1.5 m.g.d. municipal water plant addn., $175,000. W. R. Burk, Associate Architects & Engineers, 501 Pan American Bldg., New Orleans, Zone 12, archt. Barnett & Burk, Triad Bldg., Baton Rouge, consult. engrs. J. O. Herpin, city engr. CD 11/25. ENR 11/25.

Me., Dexter—Dexter Water Works, Dexter, plans underway water sys. expansion, inc. 10 ft. force main about 1 mi.; 2,000 ft. 8 in. c.i. mains, 1 story, 20x25 ft. pump. station, $35,000. S. M. Ellsworth, 6 Beacon St., Boston, Mass., consult. engr.

★**Mich., Detroit**—Dpt. Water Supply, 735 Randolph St., replacement Pumps 4, 5 and 6, Water Works Park pump. station, $450,000; flocculators in filter plant in Water Works Park, $50,000. L. G. Lenhardt, 735 Randolph St., supt.-genl. mgr. CD 3/30/43—ENR 4/2/43.

★**Mich., Detroit**—Dpt. Water Supply, 735 Randolph St., plans 40% completed, 48 in. watermain in Meyers Rd., $628,000; plans 30% completed addnl. distr. mains for elimination dead end mains, increasing water supply for fire protection and domestic use, etc., $1,451,235; plans 15% completed 42 in. water main in Conant Rd., $550,000; plans 10% completed 54 and 48 in. watermains in West Chicago and Evergreen Rds., $2,730,000; 600 hp. boiler replacement, Water Works park pump. station, $100,000; plans 5% completed 54 in. watermain in 8 Mile Rd. Livernois Ave. to Meyers Rd., $300,000; 48 in. watermain in 8 Mile Rd., Meyers, to Greenfield Rds., $350,000; 36 in. watermain in 8 Mile Rd., Greenfield to Telegraph Rd., Telegraph to Bennett Rd., $985,000; plan 1% completed coal handling equip., in Water Works Park pump. station, $180,000; Detroit Northeast Boosting Station and reservoir, $925,000; plans underway pump. station, boiler plant, switch house and coal storage at Water Works Park, $2,000,000; replacing 36 in. and up with watermains, $1,500,000; heating plants at Central and Western Yards of Water Dept., $46,000; pump discharge header, $250,000; meter shop and equip., Central Yard, $30,000; Pattern storage and repair building at Central Yard of Dept. Water Supply, $38,000; brick, steel, concrete office and locker room bldg., at Western Yard, $50,000; cross connection, pumps 3-14 at Water Works Park, $15,000; 48 in. watermain in Greenfield Rd., $900,000; 54, 48, 36 and 24 in. watermains in Eight Mile Road East, $2,550,000. L. G. Lenhardt, 735 Randolph St., Detroit, engr. CD 3/30/43—ENR 4/18/43.

Mich., Detroit—Dpt. Water Supply, 735 Randolph St., plans underway 1,000 hp. boiler installation in Springwells Pump. Station. $150,000. L. G. Lenhardt, 735 Randolph St., engr. CD 6/30—ENR 7/13.

New York—State Dpt. P. Wks., State Office Bldg., Albany, plans underway extending water supply sys., Jones Beach State Park, Nassau Co., $20,000.

N. Y., Morrisville—Village, plans underway watermains, $20,000. State Aid Planning Funds allotted.

O., Willoughby—Village, G. Thomas, clk., Town Hall, water softening plant. $30,000. Havens & Emerson, 1140 Leader Bldg., Cleveland, consult. engrs. Financing not yet provided for.

★**Okla., Tulsa**—City, W. F. McMurray, supt. City Hall, plans 10% completed addnl. gravity flow pipeline for portions of 5 mi. distance from Spavinaw Lake to Mohawk Lake, near here, together with addnl. storage capacity at Mohawk, $3,000,000. W. R. Wooten, city engr.

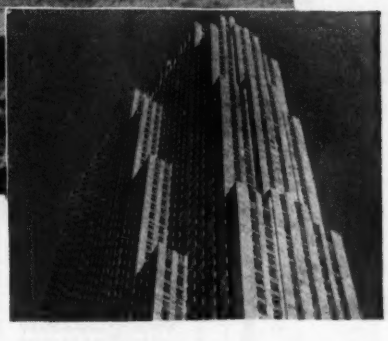
S. D., Mitchell—City, plans 50% completed enlarging present treating plant from 2 m.g.d. to 5.5 m.g.d., $75,000; 1 m.g. elevated storage tank, $100,000; water distr. sys. addns., $150,000. Chas. A. Trimmer, city engr.

★**Wis., Eau Claire**—City, O. E. Olen, clk., pump. station, supply line, reservoir, reinforcements to distr. sys. $500,000-$600,000. Greeley & Hansen, 6 N. Michigan Ave., Chicago, Ill., consult. engrs. A. R. Gannock, city engr.

SEWERS, WASTE DISPOSAL

Conn., Shelton—Town Bd. Selectmen, Town Hall, plans completed sewage disposal plant, Riverdale Ave. Over $25,000. Haller Engineering Associates, Inc., 38 Memorial Dr., Cambridge, Mass., consult. engrs.

Making strong the things that make America strong



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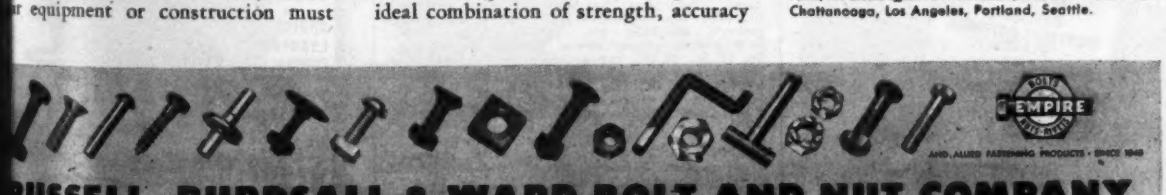

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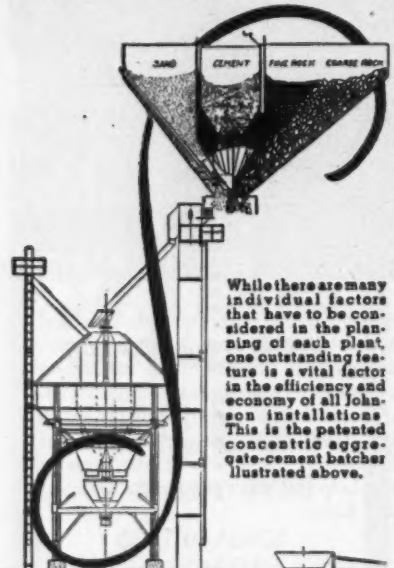

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the C. S. JOHNSON COMPANY
Champaign, Illinois

POSTWAR PROJECTS (Cont'd.)

★D. C., Wash.—Dpt. Sanitary Engineering, Sewer Div., District Bldg., storm water sewers, Item 6-15 Van Ness St. N.W., $17,400; Item 7-13 Upton St. across Federal property in line of Upton St., $5,000; Item 7-5 A, in 47 St. N.W. and Yuma St., $12,250; Item 7-6, Falls Branch storm water sewer in Yuma and 45 Sts., etc., $10,100; Item 6-15, section of Falls Branch storm water sewer, $20,200; Item 7-11 Upton St., $19,000; Item 7-14, Ordway St., $6,350; Item 7-16, Pennsylvania and Southern Aves., $10,550; Item 7-17, 26 Pl. and Camden St. S.E., $15,550; Item 6-13 A, outlet for Wisconsin Ave. storm water sewer in proposed T St., $55,000; Item 7-9, Portland and Orange Sts., and Nichols Ave., $17,600; Item 7-17, 49 St. N.E., $44,200; Item 7-15, Trenton Pl. S.E., incl. lateral lines in Brothers and Highview Places, $20,000; Item 7-3 A, Van Ness St., $25,000; Item 7-2 A, Falls Branch storm water sewer, Sect. 3 of Massachusetts Ave. Branch and in Van Ness St., $39,000; Item 7-12 A, Massachusetts Ave. N.W., 47 and Upton Sts., $16,800; Item 6-14, Falls Branch storm water sewer, Massachusetts Ave. Branch, $18,000; Item 6-1, Weaver St. N.W., $19,600; Item 7-5 18 St. S.E., $30,000; Item 7-8 Springland Lane, $50,000; No. 1500-2-61, Wheeler Rd. and Alabama Ave. S.E., $44,100; No. 1500-2-44, Deanwood storm water sewers, east of Kenilworth Ave. and Polk St., $78,000; No. 1500-2-41, 13 St. branch, Oxon Run, $51,725; No. 1500-2-60 Sheriff Rd. N.E., in Minnesota Ave., etc., $34,000; No. 1500-2-88 Dalecarlia Parkway, $23,550; Item 4, West Virginia Ave. N.E., $7,290; Item 7 Alabama Ave. and Bowen Rd. S.E., $30,000; Item 13, Eastern Ave. N.W. and N.E., $31,270; Item 18, Alabama Ave. S.E., $14,275; Item 19 Alabama Ave. S. E. and 25 St. S. E., $37,515; Item 20, Nichols Ave. S.W., $35,000; Item 21 Rock Creek Church Rd. N.W., and Allison St., $5,160; Item 22 Utah Ave. and 27 St. N.E. and Military Rd. N.W., $7,000; No. 1500-2-16 Brandywine St. N.W., $7,150; No. 1500-2-120 Division Ave. $20,370; No. 1500-2-30 Broad Branch Rd., $37,000; No. 1500-2-34, Fort Stevens Drive, $6,100; No. 1500-2-39, 33rd and S St. Branch, Naylor Run trunk sewer, $20,000; No. 1500-2-29 Luzon Valley Storm water sewer, Underwood St. N.W., $22,310; No. 1500-2-63, Georgia Ave. branch of Luzon Ave. storm water sewer, $4,335; No. 1500-2-28 Mathewson Dr. and Argyle Terrace $10,465; No. 1500-2-32 Naylor Run Trunk Sewer, $68,690; No. 1500-2-33, Anacostia Ave. and Lane Pl., $37,870; No. 1500-2-40, 55 St. N.E., $49,785; No. 1500-2-42, 7 St. extended, branch-Oxon Run, $25,600; No. 1500-2-43, 33 St. extended, N.E., $34,845; No. 1500-2-51, exten. Barnaby St., $9,000; No. 1500-2-52, Nebraska Ave. NW., $6,700; No. 1500-2-58, New York Ave. N.E., $25,420; No. 1500-2-59, Blaine St. Trunk Sewer, $31,055; No. 1500-2-66, Elys Run Trunk Sewer, $71,200; No. 1500-2-53, outlet for Deanwood storm water sewers, $90,000; No. 1500-2-78, Congress St. S. E., $42,400; No. 1500-2-62, Arizona Ave. $54,300; No. 1500-2-68, 26 St. branch, $33,600; No. 1500-2-69, 14 St. branch-Brentwood Village, $22,900; No. 1500-2-67, Smiths Branch Trunk sewer, $26,220; No. 1500-2-55, incompleted portion Southern Ave. and Suitland Rd. $13,000; No. 1500-2-71, Hawes Run Trunk Sewer, $42,770; No. 1500-2-119, Ivy City Trunk Sewer-branches in 12, W, and Downing Sts., $262,100; No. 1500-2-121 Falls Branch storm water sewer, main outlet 49 St. and Massachusetts Ave., $120,250; No. 1500-2-18, Watts Branch flood control, $318,000; No. 1500-2-38, from vicinity of 10 and Buchanan Sts. N.E. northward to Eastern Ave. and Farragut St., $135,000; No. 1500-2-94, Piney Branch drainage control, along Piney Branch Parkway, $217,000; No. 1500-2-65 Burnt Bridge Run trunk sewer, $106,130; No. 1500-2-76, 55 Place N.E., extended, and New York Ave., $134,000; No. 1500-2-85, Pope's Run, $254,025; No. 1500-2-86, Scaggs Branch, $128,700; No. 1500-2-75, Pope's Run (main outlet) $100,000; replacement and sanitary sewers No. 1500-2-73, Arizona Ave. intercepting sewer, $105,000; Item 6-2 E St. N.E., replacement sewer, $2,600; Item 6-13 Main Ave. S.W. relief sewer, $15,000; Item 7-2 Navy Yard replacement in grounds of U. S. Navy Yard in line of 9 St. S.E., $7,500; Item No. 1500-2-46, M St. S.E. replacement sewers, $14,430; Item 14, Massachusetts Ave. N.W., $18,000; Item 15, Eye St. N.W. $20,000; Item 16, 15 St. N.W., $34,570; Item 17 6 St. N.W., $12,500; No. 1500-2-31 A, adjustments to sewerage sys., vicinity Rock Creek, P and Q Sts., $12,947; No. 1500-2-37 sanitary outlet sewer through rights-of-way between 31 and Adams Sts., to East side interceptor at 28 St. and New York Ave., $20,500; No. 1500-2-74 outfall sewer between Poplar Point pump. station and Head House $107,000; No. 1500-2-47, New York Ave. N.W., replacement sewers between 14 and 12 Sts. N.W., also exten. low area sewer in s. s. New York Ave. between 13 and 12 Sts., $11,440; No. 1500-2-48, 21 St. replacement sewers, $23,255; No. 1500-2-49, First St. N.W., replacement sewer, $2,560; No. 1500-2-56, 13 St. N.W., replacement sewer, $18,525; No. 1500-2-57, 12 St. N.W., replacement sewer, $11,250; No. 1500-2-110, K St. S.W., replacement sewer, $3,300; No. 1500-2-111, 8 St. N.W., replacement sewer, $2,760; No. 1500-2-50, Gales St. replacement sewer, $2,225; No. 1500-2-97, South Capitol St., $50,000; No. 1500-2-70, 14 St. N.W. replacement sewer, $16,000; No. 1500-2-26, R St. N.W. replacement sewer, $6,100; No. 1500-2-103, C St. N.E. replacement sewers, $3,675; No. 1500-2-112 South Carolina Ave. S.E., $3,000; No. 1500-2-100 D St. S.E. replace-

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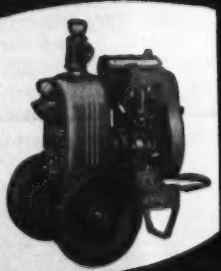

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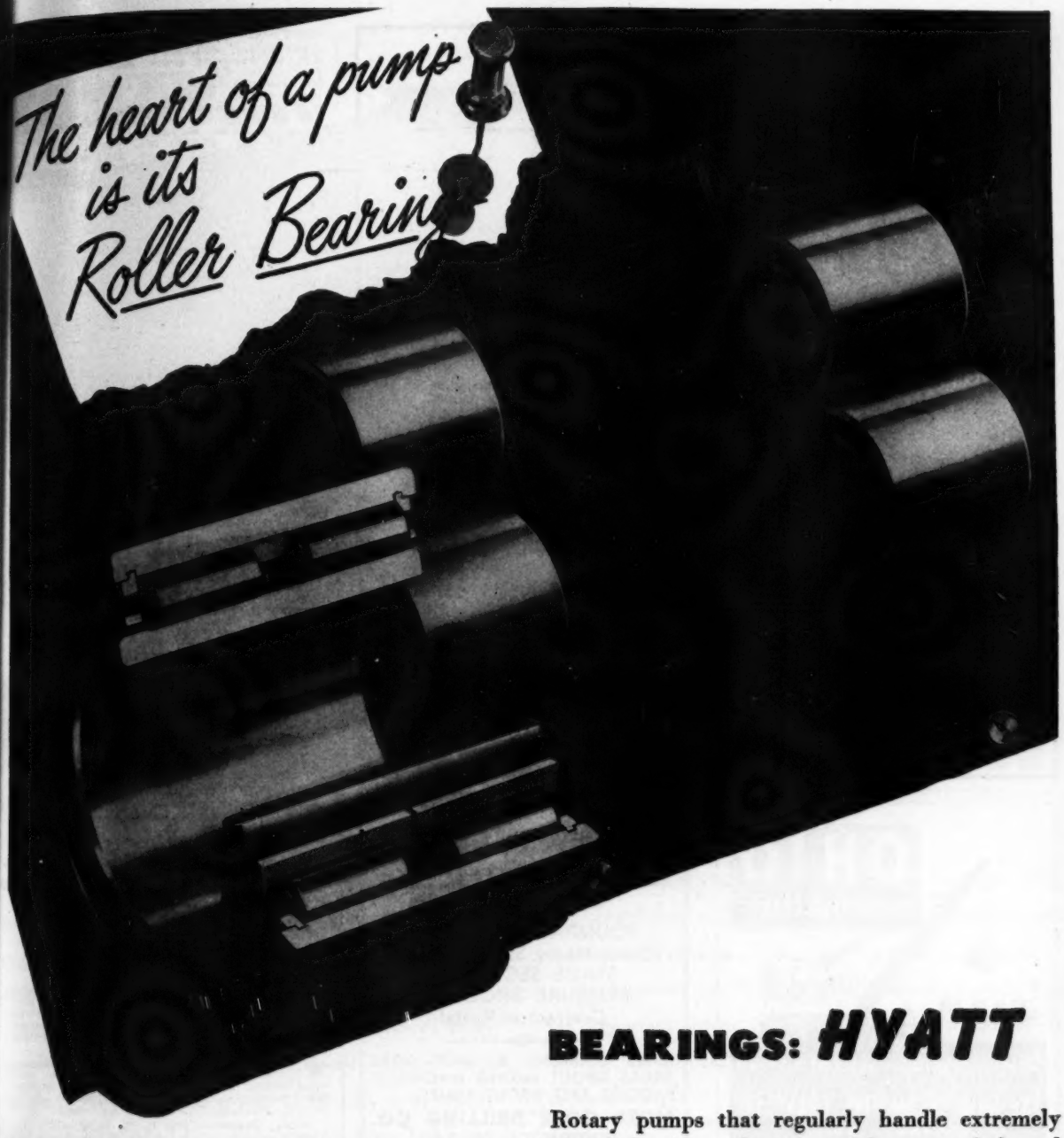

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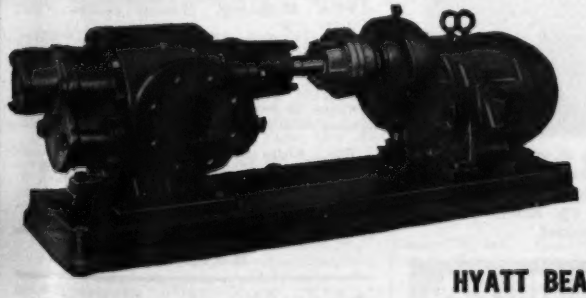

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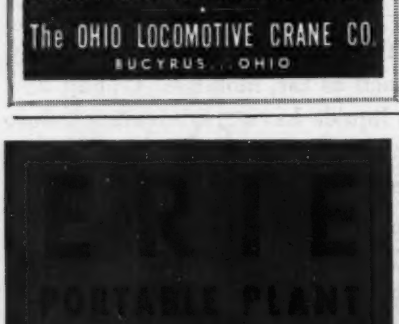

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POSTWAR PROJECTS (Cont'd.)

ment sewer, $30,240; No. 1500-2-101 A St. S.E. replacement sewer, $3,380; No. 1500-2-102, C St. S.E. replacement sewer, $2,340; No. 1500-2-104, Virginia Ave. S.W. replacement sewer, $2,550; No. 1500-2-105 T St. N.W. replacement sewers, $9,500; No. 1500-2-106, Eye St. N.W. replacement sewer, $1,950; No. 1500-2-108, Hanover St. N.W. replacement sewer, $2,425; No. 1500-2-109 K St. N.W. replacement sewers, $15,850; No. 1500-2-122, restoration old sediment chamber at main pump. station, incl. installing screens as well as redesign of north end of old sediment chamber, $50,000; No. 1500-2-72, Rock Creek Diversion Sewer (west side) Sect. 1, $100,000; No. 1500-2-96, Piney Branch Relief Sewer, 5 St. N.W., $675,000; No. 1500-2-116, R St. N.W. Relief Sewer, $403,000; No. 1500-2-117, L St. N.W. Relief Sewer, $693,000.

★**Ill., Bloomington**—City, preliminary report completed, plans underway relief sewerage sys. for present combined sys. $2,500,000. Warren & Van Praag, Inc., 447-450 Standard Office Bldg., Decatur, consult. engrs. J. J. Woltmann, Unity Bldg., Bloomington, asso. engr. S. Wilhoit, city engr.

Ill., Galesburg—City, City Hall, plans 25% completed sanitary and storm sewers, $240,000. A. O. Nordheilm, city engr.

Ill., Hamilton—City Hall, plans 70% completed exten. sanitary sewers and sewage disposal. $65,000. Financing not yet provided for. Austin Eng. Co., 115 S. Jefferson, Peoria, consult. engr.

★**Ill., Jacksonville** — City, storm sewer. $500,000. E. Henderson, city engr.

Ill., Knoxville—City, City Hall, plans 20% completed sewage exten., sewage disposal. $95,000. Austin Eng. Co., 115 S. Jefferson St., Peoria, consult. engrs.

★**Ill., Peoria**—City Eng. Dpt., City Hall, plans 90% completed storm water sewer on East and Center Bluff, $450,000; preliminary sketches underway storm sewer on West Bluff, $150,000. L. D. Jeffries, city engr. CD 6/1/43—ENR 6/3/43.

★**Ill., Quincy**—City Dpt. Sanitation, City Hall, relief storm sewerage sys. $500,000. J. O. Porter, City Hall, city engr.

★**Ind., Elkhart**—Bd. P. Wks., G. Hallett Neale, mayor, chn., City Hall, sewage treatment plant and sewerage sys. $2,000,000. Finances not yet provided for. E. M. Brady, City Hall, city engr. CD 12/3—ENR 12/9.

Ind., Lafayette—City, plans 75% completed, North Side Sewer. $65,000.

Ind., New Castle—City, S. Baker, mayor, City Hall, plans 50% completed, enclosing northeast Bowery Brook Branch. $25,000. City Engineering staff, engrs.

★**Ind., South Bend**—City, c/o Engineering Dpt., City Hall, large interceptor sewer into suburbs and outlying districts, $2,125,000; sewage treatment plant, $1,100,000. C. E. Williams, city engr.

Ky., Paducah—City, plans 5% completed sanitary and storm sewers for two year program. $95,000. Financing not yet provided for. T. A. Bradley, City Hall, city engr.

Mich., Detroit—City Dpt. Water Supply, 735 Randolph St., plans 2% completed dry ash handling sys., in Detroit Sewage Plant, for Water Dpt. $60,000. L. G. Lenhardt, 735 Randolph St., engr.

★**Mich., Detroit**—Wayne Co., County Bldg., plans complete, financing not yet provided for covering and enclosure north branch of Ecorse Creek, rein.-con. construction, $6,291,000. L. C. Smith, 3800 Barium Tower, Zone 26, engr.

★**Mich., Detroit** — Wayne Co., Barium Tower, plans completed rein.-con. covered drain, Frank and Poet drains, $4,010,000; Sexton Kilford Drain, $4,120,000. L. C. Smith, Barium Tower, co. hy. engr.

Minn., Jasper—City, L. H. Berg, clk., City Hall, retained Perkins & McWayne, engrs., 322 Paulton Bldg., Sioux Falls, S. D., to prepare plans and specifications sanitary sewerage sys., sewage disposal plant. $75,000.

N. Y., Hempstead—Village, plans underway, storm drains, drainage structures, $40,000. State Aid Planning Funds allotted.

★**O., Cincinnati** — Hamilton Co., Court House, combined concrete and vitr. sewers, $3,500,000. Huston Coates, Court House, engr.

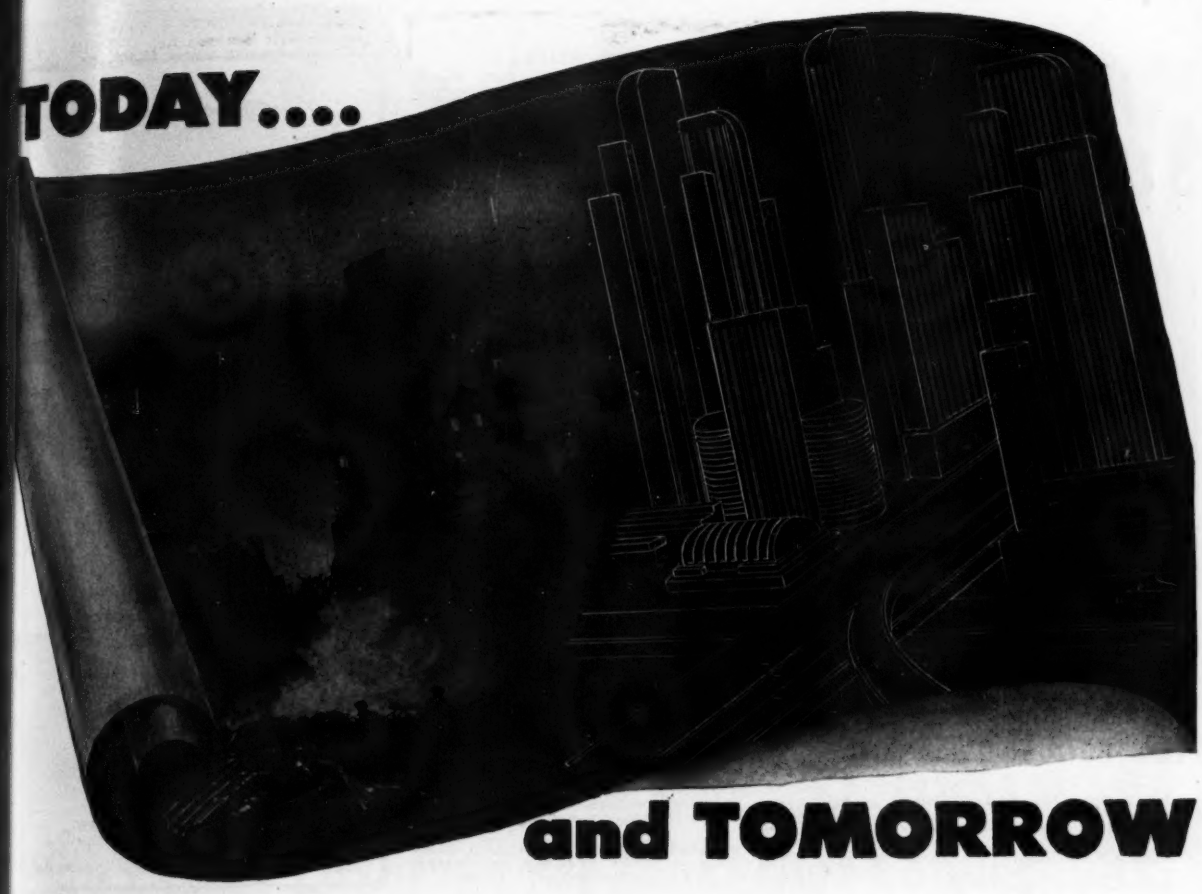
R. I., Exeter—State, Dpt. Social Welfare, 40 Fountain St., Providence, sewage disposal facilities, Exeter State School. Over $25,000.

★**Tex., Houston**—City, plans 10% completed, sanitary sewers, $8,100,000; storm sewers, $6,500,000. Horner & Elrod, City Hall, consult. engrs. J. Fugate, City Hall, ch. city engr. CD 4/3—ENR 4/20.

Wis., Rhinelander—City, plans 50% completed incinerator. $30,000. Financing not yet provided for. Greeley & Hansen, 6 N. Michigan Ave., Chicago, Ill., consult. engr. T. M. Wardwell, city engr. CD 4/8/43—ENR 4/15/43.

BRIDGES

★**D. C., Wash.**—District Comrs., District Bldg., plans 90% completed Dupont Circle underpass. $1,250,000. CD 1/27—ENR 2/10.



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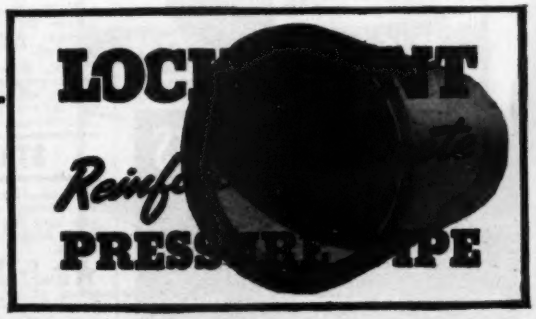

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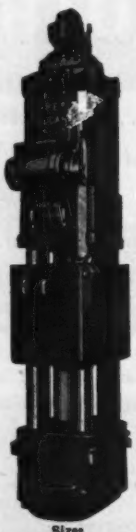

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POSTWAR PROJECTS (Cont'd.)

★**Ill., Galesburg**—City, City Hall, sketch plans underway overhead bridge over Santa Fe R. R. at North Farnham St., $224,000; overhead bridge, necessary approaches over Santa Fe R. R. at North Seminary St. or North Chambers St. or North Broad St. or North Cherry St., $307,000; overhead bridge, necessary approaches over Santa Fe R. R. at West Main St. Crossing, $476,000; subway on S. Chambers and Mulberry Sts., $655,000; reconstructing existing subway at E. North St. under C. B. & Q. R. R. $225,000; subway on S. Chambers and Knox Sts., $350,000; subway on S. Academy and Third Sts., $300,000; subway under East Main St. at C. B. & Q R. R. Crossing, $452,000; plans completed reconstructing existing subway at East Losey St., $224,000. W. W. Polk, ch. engr. Ill. Div. Hys., Centennial Bldg., Springfield, consult. engr. A. O. Nordhielm, City Hall, city engr.

★**Ind., Indianapolis**—Marion Co. Bd. Flood Control, A. H. Henry, chn., and city engr., City Hall, making plans rein.-con. bridge over Fall Creek at Indiana Ave., $230,000; concrete, steel bridge over White River north of 10 St., $3,500,000; 2 rein.-con. bridges over White River at 16 and 30 Sts., $400,000 each; rein.-con. highway bridge over Eagle Creek at Minnesota St., $300,000; 3 rein.-con. bridges over White River at Kessler Blvd., College Ave., and State Road 431, $250,000 each; rein.-con. highway bridges over White River at Michigan St., $400,000; over White River at Raymond St., $300,000; over White River at Harding St., $200,000; over Fall Creek at Capitol Ave., $200,000; over Fall Creek at College Ave., $200,000; over Fall Creek at Central Ave., $200,000; over Fall Creek at Illinois St., $200,000; reconstructing steel, concrete Monon Ry. bridge over White River at Broad Ripple, $100,000; rein.-con. bridge exten. over White River, at 10 St. $100,000; reconstructing 4 rein.-con., steel railroad bridges over White River, south of Washington St., $250,000 each. Financing not yet provided for. CD 7/22/43—ENR 8/12/43.

Ind., South Bend—City, C. E. Williams, engr., bridges, at Sample and Jefferson Sts. $150,000.

Maine—State Hy. Dpt., State House, Augusta, City of Lewiston and Androscoggin Co., Lewiston, concrete, steel bridge over Little Androscoggin River at Main St. $100,000.

Massachusetts—State P. Wks. Dpt., Boston, plans completed rein.-con. hy bridge, Route 5-A, Agawam-West Springfield. $250,000.

Massachusetts—State P. Wks. Dpt., Boston, plans completed rein.-con. hy. bridge, Route 202, Winchendon-Templeton, $120,000.

Mass., Wareham—Town Bd. Selectmen, Town Hall, rein.-con., steel bridge, Paper Mill Rd. $30,000.

★**Mich., Detroit**—Dpt. P. Wks., City Hall, plans completed, 8 concrete, steel highway bridges, concrete fdns., across canals on Belle Isle, $321,500; 16 concrete pedestrian tunnels under various streets, $321,700; highway underpass at East Grand Blvd. and Michigan Central Belt Line Ry., $700,000; plans 75% completed steel, concrete underpass at Lonyo Ave. and Central Ave. and Michigan Central Ry. main line, $1,850,000; plans 95% completed steel, concrete underpass at Dearborn Ave. $2,000,000; highway underpass at Caniff and Lynch Road crossings of railroad, $2,500,000. Geo. R. Thompson, City Hall, city engr. CD 5/30/43, 4/14/44—ENR 4/1/43, 5/4/44.

★**New Hampshire**—State Hy. Dpt., Concord, 1,200 ft. steel, concrete bridge, incl. 5 mi. hy., Seabrook and Hampton, $1,750,000.

★**N. Y., Lincoln**—Comrs. Nassau Co., plans underway bridge on East Rockaway Rd., $50,000; Long Beach Bridge, $700,000; Saddle Rock Bridge over Udall Pond, $350,000. State Aid Planning Funds allotted.

N. Y., Sardinia—Comrs. Erie Co., Buffalo, plans underway, county line bridge. $40,000. State Aid Planning Funds allotted.

N. Y., Stratford—Comrs. Fulton Co., Johnstown, plans underway bridge. $35,000. State Aid Planning Funds allotted.

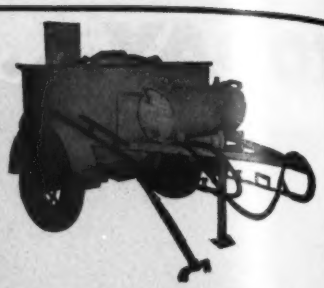
N. Y., Yorkshire—Comrs. Cattaraugus Co., Little Valley, plans underway county line bridge. $40,000. State Aid Planning Funds allotted.

Tex., Houston—City, plans 50% completed constructing 300 ft. pedestrian and vehicle bridge 40 ft. roadway across Buffalo Bayou on Milam St. $225,000. H. W. H. Zapp, Courthouse, engr. CD 1/3—ENR 1/13.

STREETS AND ROADS

Conn., Greenwich—Town, C. W. Hubbard, Bd. Educ., plans completed, grading, drainage and land work various schools. $45,000. S. E. Minor & Co., Inc., Smith Bldg., consult. engrs.

★**D. C., Wash.**—District Comrs., District Bldg., plans underway, K St. Trunk Hy. from 12 St. N.W. to N. Capitol St.; West Virginia Ave. N.E. from Mt. Olivet Rd. to New York Ave.; Reno Rd. N.W. from Rodman St. to Van Ness St., Yuma St. to



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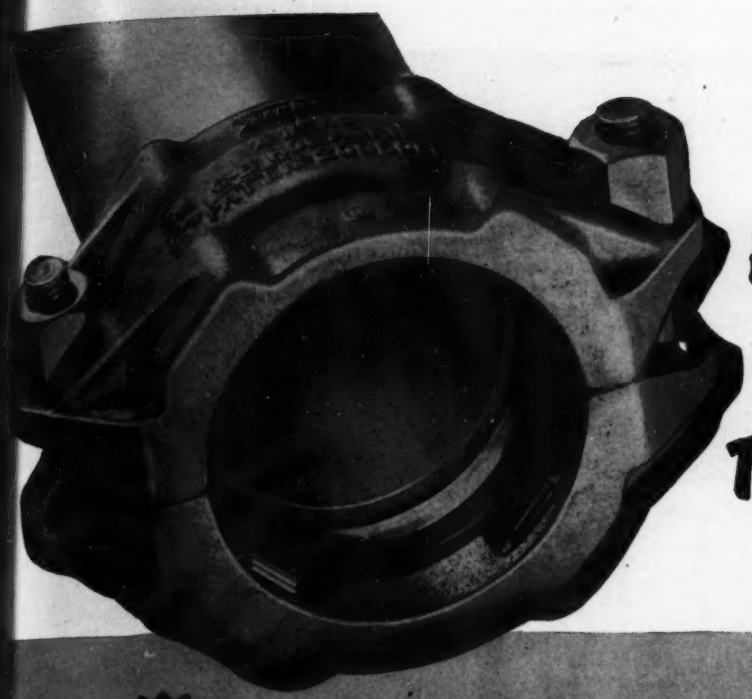

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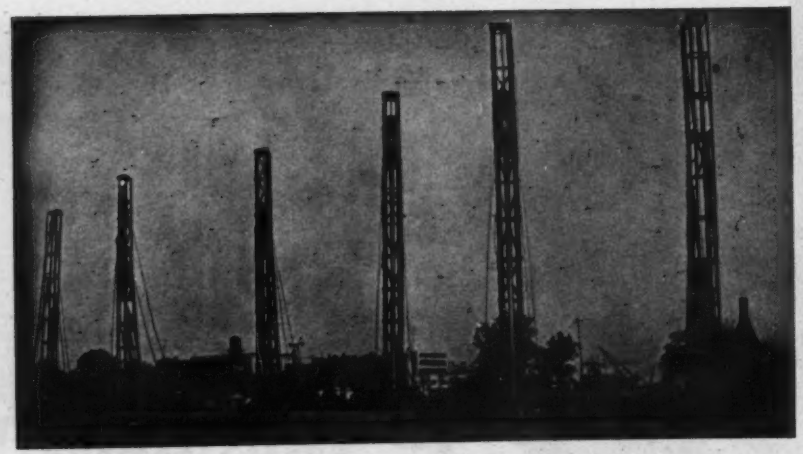

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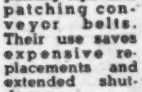

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POSTWAR PROJECTS (Cont'd.)

Chesapeake St. and Davenport St. to Nebraska Ave.; Sheriff Rd. N.E. from Minnesota Ave. to D. C. line; Alabama Ave. and Bowen Rd. S.E. from Pennsylvania Ave. to District line; 49 St., Quarles St. and Minnesota Ave. N.E. from Sheriff Rd. to Eastern Ave.; Weaver St. and Place N.W. from Loughboro to Canal Rds.; M St. S.E. from 4 to 11 Sts.; Dalecarlia Parkway N.W. from Loughboro Rd. to Massachusetts Ave.; Massachusetts Ave. N.W. from Nebraska Ave. to D. C. line; Eastern Ave. N.W. and N.E. from New Hampshire Ave. to Laurel St.; Massachusetts Ave. N.W. from New Jersey Ave. to 7 St.; Eye St. N.W. from Massachusetts to New York Aves.; 15 St. N.W. from Massachusetts to Florida Aves.; 6 St. N.W. from M St. to Rhode Island Ave.; Alabama Ave. S.E. from 12 to 21 Sts.; Alabama Ave. S.E. from 21 St. to Good Hope Rd. and 25 St. S.E. from Alabama Ave. to Good Hope Rd.; Nichols Ave. S.W. from Chesapeake to Joliet Sts.; Rock Creek Church Rd. N.W., from Harewood Rd. to N. Capitol St., and Allison St. from Rock Creek Church Rd. to Hawaii Ave.; Utah Ave. and 27 St. N.W. from Military Rd. to Nebraska Ave. and Military Rd. N.W. from Oregon Ave. to 27 St.; S. Capitol St. from O to Canal Sts.; Riggs Rd. N.E. Grade Separation and Kansas Ave. N.E. Grade Separation, Baltimore & Ohio R. R. **$30,000,000.** CD 1/27—ENR 2/10.

★**D. C., Wash.**—District Comrs., District Bldg., plans completed K St. N.W. elevated highway between Rock Creek and Key Bridge. **$2,200,000.** CD 1/27—ENR 2/10.

★**Ill., Belleville**—St. Clair Co., c/o Bd. Supervrs., Court House, plans underway constructing, imprv. roads, hys., various parts of county, **$700,000.** B. C. McCurdy, Belleville, co. supt. hys.

Ill., Canton—City, City Bldg., concrete paving Eighth St. Anderson to Birch Sts, **$62,212;** Birch St. from Main to 7 Sts, **$38,668;** 32 sections, **$296,168.** J. K. Kleinsteiber, city engr.

Ill., Galesburg—City, City Hall, plans 10% completed street paving, widening, constructing curbs and gutters, **$257,000;** plans completed constructing E. First St. between Seminary and Day Sts., **$28,241;** plans reconstructing E. Main St. from Public Square to C. B. & Q. R. R., **$60,480;** Simmons St. from S. Seminary to S. Cherry Sts., **$43,982;** Fern St. from North Seminary to North Cherry Sts., **$43,892.** A. O. Nordhielm, city engr.

Ill., Harrisburg—Saline Co., Harrisburg, plans 30% completed, reconstructing roads, widening, etc. **$350,000.** R. D. Brown, supt. Hys., Harrisburg, engr.

Ill., Jacksonville—Morgan Co., Court House, T.B.S.C. surfacing 5 mi. Sect. 27 MFT S.A. Route 8 from Murrayville to Scott Co. line, **$45,000;** 6 mi. Sect. 26 MFT S.A. 2, **$48,000;** plans 2/3 completed 4.5 mi. Sect. 25 MFT, S.A. 2, **$35,000;** plans completed 5.78 mi. Sect. 21 MFT, S.A. 8, **$44,776.** C. H. Harney, Jacksonville, supt. Co. Hys. W. W. Polk, Centennial Bldg., Springfield, ch. hy. engr.

Ill., Quincy—City, plans 30% completed concrete streets imprvs., **$124,650;** bituminous surface treatment on stabilized crushed stone paving street imprvs., **$137,600;** plans completed concrete paving 36 ft. on Cedar St. between 24 and 28 Sts., together with storm sewerage sys., **$40,000;** plans 50% completed sheet asphalt resurfacing existing pavements, **$79,500.** J. O. Potter, City Hall, city engr.

★**Ind., Fore Wayne**—City, super highway around suburban area of city with broad through streets going into downtown area, incl. 24 mi. new construction, **$2,400,000,** 19 access points, **$1,750,000,** bridges and railway grade separations, **$1,200,000.** J. White, city traffic engr. CD 12/8—ENR 12/16.

Ind., South Bend—City, plans 50% completed, concrete paving 69,100 sq. yd., **$276,440;** bituminous paving 50,040 yd., **$150,123.** C. E. Williams, city engr.

★**Ky., Paducah**—City plans 5% completed concrete curbing, guttering paving streets for three year program. **$750,000.** Financing not yet provided for. T. A. Bradley, City Hall, city engr.

★**Massachusetts**—State, Pub. Wks., Boston, plans completed state hy. in Chicopee-Hadley, **$550,000.**

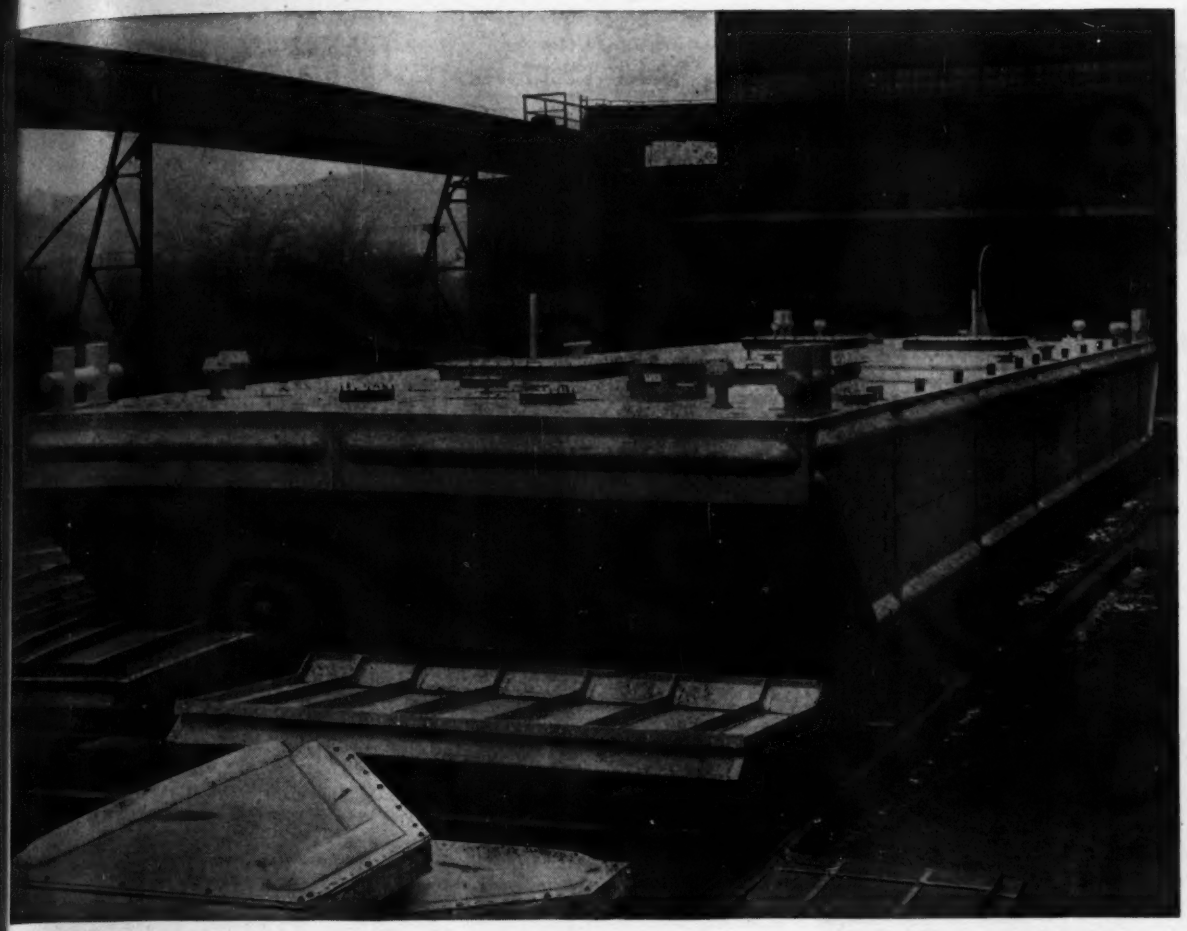
Minn., Benson—City, S. A. Berg, clk., making plans street imprvs. Over **$25,000.** Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, consult. engrs. **(Correction**—owner). CD 7/6—ENR 1/27.

★**New Hampshire**—State Hy. Dpt., Concord, plans underway 14¾ mi. Lafayette Rd. from Portsmouth to Massachusetts State line. **$2,500,000.**

★**N. Y., Buffalo**—Comrs., Erie Co., plans underway highway connecting proposed Niagara Thoroughway, **$540,000.** State Aid Planning funds allotted.

N. Y., Hudson—Comrs. Columbia Co., plans underway, reconstructing town road. **$37,000.** State Aid Planning Funds allotted.

★**N. Y., Westbury**—Village, plans underway, curbing, guttering, **$285,120;** resurfacing streets, village wide, **$178,200;** sidewalks, **$105,000.** State Aid Planning Funds allotted.



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POSTWAR PROJECTS (Cont'd.)

★**O., Cincinnati**—Hamilton Co., Court House, concrete and macadam roads, $1,000,000. Huston Coates, Court House, engr.

S. D., Mitchell—City, plans 80% completed bituminous resurfacing approx. 225,000 sq. yd. existing concrete and bituminous pavement. $175,000. Chas. A. Trimmer, city engr.

★**Tex., Dallas**—State Hy. Dpt., and City of Dallas, Dallas plans 75% complete Central Blvd. construction and paving, 1st unit on Preston and Lamar Sts. between Park Row and Commerce Sts., $600,000; plans 10% completed 2nd unit Central Blvd. paving program, $400,000. J. G. Rollins, 6926 Meadow Lake and c/o City Hall, Dallas, engr.

Tex., Goose Creek—B. B. Williams, Goose Creek, grading, leveling, paving streets for residential project. To exceed $25,000.

★**Tex., Houston**—City opening Shepherd St. into Greenbriar, $50,000; concrete and asphalt street paving, topping, street widening and reconstruction, etc., $4,500,000. CD 9/29—ENR 10/6. J. Fugate, City Hall, city engr.

★**Tex., Houston**—State Hy. Dpt., Austin, plans 5% completed down-town link in Houston-Galveston super-hy. project, $9,319,000. CD 1/10—ENR 1/27.

★**Wis., LaCrosse**—City, F. Kramer, clk., grading, paving streets, $2,553,766. J. H. Barth, city engr.

★**Ont., Hamilton** — City, S. Lawrence, mayor, and H. L. Lyme, chn., Post-War Reconstruction Com., road imprvs., incl. widening Main St. from Queen westerly to Dundas cut-off, $260,000; highway entrance from Queen Elizabeth Way circle to Barton St. and Strathearne Ave. incl. subway to C. N. R., $200,000; exten., widening various streets, $775,000; Bayshore drive from James St. westerly to connect with Queen Elizabeth Way, $600,000; further extens., widening, straightening various streets, $525,000. Total est. $5,000,000. W. L. McFaul, c/o owner, engr. CD 7/30—ENR 8/6.

EARTHWORK, WATERWAYS

★**Ind., Indianapolis**—Marion Co. Bd. Flood Control, A. B. Henry, chn. and city engr., City Hall, flood control, widening, deepening and levee construction Eagle Creek, from Raymond to Washington Sts., $500,000; Eagle Creek, ½ mi. south of Raymond St. to Raymond St., $275,000; White River, Northwestern Ave. to Broad Ripple, $2,500,000; White River from Thompson Rd. to Harding St., and from Harding to Raymond Sts., $2,700,000; White River from mouth of Fall Creek to 30 St., $1,100,000; along White River, from mouth of Fall Creek to Burdsal Pkwy., $500,000; White River from Dollar Hide Rd. to Thompson Rd., $900,000; rein.-con. dam over White River at Emrichsville, $250,000; automatic pump. stations, various drainage outlets into White River, $100,000. Financing not yet provided for. CD 7/22/43—ENR 8/12/43.

★**Mich., Detroit** — Wayne Co., Barium Tower, plans completed harbor lands along Detroit River for addnl. facilities for Port of Detroit Auth. $3,000,000. L. C. Smith, 3800 Barium Tower, co. hy. engr.

N. H., Hampton Beach—State Hy. Dpt., State House, Concord, plans underway, 3,600 ft. stone, concrete seawall and walk, $200,000. D. H. Dickinson, 149 North Main St., Concord, consult. engr.

N. Y., Westbury—Village, plans underway drainage structures, $31,000. State Aid Planning Funds allotted.

Pa., Phila.—City Water Bureau, City Hall, dredging Queen Lane water filtration plant, $200,000; dredging Roxborough water filtration plant, $200,000.

Tenn., Nashville—State Hy. Dpt., Nashville, constructing fill in Wolfe River bottom.

Tex., Galveston—City, plans 50% completed drainage. Ford, Bacon & Davis, 39 Bway., New York, N. Y., consult. engrs. CD 5/12—ENR 6/1.

★**Tex., Houston**—City, voted $1,000,000 bonds, flood control, J. M. Nagle, City Hall, city engr; drainage, $1,000,000, J. Fugate, City Hall, engr. CD 5/7/43 and 7/30/43—ENR 5/13/43 and 8/5/43.

PUBLIC BUILDINGS

Conn., Bridgeport—City School Bd., 804 Main St., brick, steel school, north end section, Madison Ave. $150,000. CD 12/15—ENR 1/13.

★**D. C., Wash.**—District Comrs., District Bldg., Junior High School, vicinity Ninth and C Sts. S. E., replacing present Hine Junior High School, $980,000; 16 room school bldg., in vicinity New Jersey Ave. and P Sts. N.W., replacing present Morse and Twining Schools, $357,350; 24 room school bldg., in vicinity of recreation center at Nichols Ave. and Sumner Rd. S.E., re-

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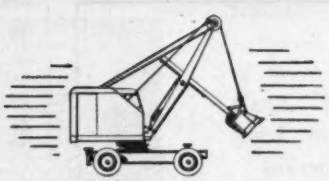

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POSTWAR PROJECTS (Cont'd.)

placing Birney School, $500,000; Taft Junior High School addn., 18 and Perry Sts. N.E., $207,000; 8 room extensible school bldg., vicinity Stanton Rd. and Bruce Pl., South east, $200,000; 8 room school addn., on site at Logan School, 3 and G Sts. N.E., $250,000; 8 room school bldg., 4 rooms to be left unfinished in vicinity of Hillside Rd. and Alabama Ave. S.E., $45,000; 8 room school bldg., vicinity of Kenilworth Ave. and Barnes Lane N.E., $200,000; 15 room Junior High School addn., on 2nd and 3rd floors of Banneker Junior High School, Euclid St. between Georgia and Sherman Aves. N.W., $175,000; stabilization and drainage ground at Young School, Browne Junior High and Phelps Vocational Schools, all at 24 St. and Benning Rd. N.E., $135,000.

Ill., Bloomington—City, plans 20% completed by Shaeffer & Hooten, Peoples Bank Bldg., 2 and 3 story, bsmnt., stone city hall on site of present one. $200,000. Financing not yet provided for and legal obstacles to be overcome.

Ill., Galesburg—City, City Hall, sketch plans underway high school, 700 North Maple St., $125,000. A. O. Nordhielm, city engr.

★**Ill., Galesburg**—City, City Hall, sketch plans underway low priced housing program, $500,000. A. O. Nordhielm, city engr.

★**Ill., Jacksonville**—117 District, 500 W. State St., plans underway by Smith, Kratz & Strong, 101 S. Bway., Urbana, Senior High School, Independence St. $300,000.

Ill., Lincoln—Bd. Educ. for Lincoln Elementary School Dist. 27, Dr. E. C. Gaffner, pres., plans completed by Smith, Kratz & Strong, 101 S. Bway., Urbana, and $95,000 bond issue voted, 2 story, brick school on present site, incl. main bldg., gymnasium, kitchen, boiler room, etc., $200,000; plans completed by Berger & Kelly, 44 Main St., Champaign, 2 story, brick community high school addn., Bway. St., $275,000.

★**Ind., Indianapolis**—Central Indiana Hospital, M. Bahr, M. D., supt., West Washington St., Mt. Jackson, Indianapolis, plans by McGuire & Shook, 1400-01 Fletcher Trust Bldg., insane hospital expansion, incl. men's dormitory cottages, receiving ward, dormitory cottage for tubercular patients, store rooms, refrigerating equip. $1,700,000; Bevington, Taggart & Fowler, 730 Indianapolis Pythian Bldg., mech. engr. CD 11/22—ENR 11/25.

Ind., South Bend—City, City Hall, enlarging auditorium. $1,000,000 or more. C. E. Williams, city engr.

★**Ind., South Bend**—Healthwin Hospital, E. W. Custer, M. D., supt., R.R. 4, South Bend and Bd. Comrs. St. Joseph Co., N. A. Musser, aud., Court House, preliminary plans by Maurer & Maurer, 101 Lincolnway East, brick, stone trim, rein.-con. main bldg. wing addn., nurses' home, staff house, $600,000.

Ia., Sanborn—City, H. Kissler, mayor, voted $130,000 bonds, electric light and power plant.

Me., Augusta—City, M. Williams, mayor, chn. Bldg. Com., City Hall, brick, steel armory, State House Park, Over $150,000.

★**Md., Baltimore** — City, preliminary sketches underway by The J. E. Greiner Co., archt. and consult. engr., 1201 St. Paul St., new Lexington market. $2,000,000.

Mass., Littleton—Town, Selectmen, Town Hall, plans by Kilham, Hopkins & Greeley, 126 Newbury St., Boston, 2 story, brick, steel, municipal bldg., housing town offices, auditorium, assembly room and dining hall, $150,000.

★**Mass., Quincy**—City, Chas. Ross, mayor, City Hall, brick, stone city hall, $500,000-$1,000,000.

Mass., Wareham—Town, E. H. Morse, chn., Town Hall, brick municipal garage, housing machinery, trucks, cars, maintenance facilities. $45,000.

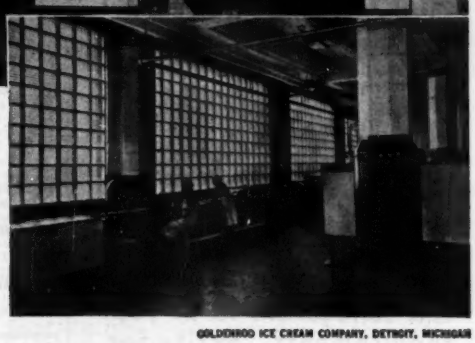
★**Minn., St. Paul**—Minnesota State Agricultural Society, R. A. Lee, secy., State Fair Grounds, restoration Fair Grounds bldgs., rehabilitate Hippodrome, livestock pavilion, horse barn, swine-sheep barn, poultry bldg., sidewalks, paving, curbs, etc., $750,000-$1,000,000; construct new agriculture-horticulture bldg. on site of present bldg., architectural concrete, 1 story with tower, 300 ft. octagonal, 110 ft. tower, glass blocks, etc., $500,000. Wright & MacGregor, Administration Bldg., State Fair Grounds, archt.

★**N. Y., Alfred**—Dpt. P. Wks., State Office Bldg., Albany, plans underway, home economics bldg., $318,170; gymnasium and auditorium, $245,000, both at Alfred Agricultural and Technical Institute.

★**N. Y., Long Island City**—Dpt. P. Wks., Municipal Bldg., New York, Zone 17, plans completed by Roberts & Schaefer, Inc., & C. Latimer, 307 N. Michigan St., Chicago, Ill., 2 story, 216x606 ft., refn.-con. repair shop, Hunts Point Ave. between 149 and 35 Sts., for Fire Dpt. $1,800,000.

N. Y., Mayville—Bd. Supervs., Chautauqua Co., C. B. Goodrich, clk., preliminary plans by R. A. Freeburg, 1105 W. 3 St., Jamestown, office bldg. $150,000.

OW—ICE CREAM PLANTS AND CREAMERIES



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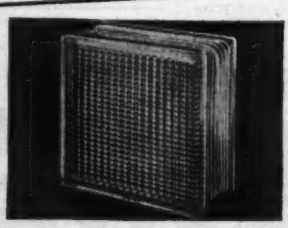

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POSTWAR PROJECTS (Cont'd.)

★**N. Y., New York**—City Planning Comn., Municipal Bldg., world fashion center, on site extend. from 24 to 30 Sts. inclusive, between Bway. and 6 Ave. **$40,000,000-$45,000,000.** CD 1/26—ENR 2/10.

★**N. Y., New York**—Dpt. Parks, 61 St. and 4 Ave., Arsenal Bldg., Central Park, plans underway by Aymar Embury II, 150 E. 61 St., Zone 21, and E. J. Williams, 126 E. 38 St., Zone 16, circulating library known as Donnell Free Library, 53 St. between 5 and 6 Aves., **$900,000**; expansion Central Library Bldg., 42 St. and 5 Ave., **$2,000,000**, for Dpt. Museums & Institutions. CD 6/15—ENR 6/22.

★**O., Cincinnati**—Hamilton Co., R. C. Campbell, comr., Court House, brick, stone public library. **$3,500,000.**

★**O., Cleveland**—City, Dpt. Police, F. Celebrezze, dir., City Hall, plans 10% completed by H. Kregelius, city archt., 517 City Hall, mounted police headquarters bldg., **$150,000**; repair shop bldg., Hamilton Ave., **$85,000**; general rehabilitation police bldg., **$135,000**; broadcasting station, **$226,250**; 4 district headquarters bldgs., **$3,235,000.** Financing not yet provided for. CD 12/10—ENR 12/16.

★**O., Columbus**—State, T. C. Holy, chn. Bureau State School for Blind Educ., 175 High St., plans underway by Maier, Outcalt, Dickerson & Assoc., 13124 Shaker Sq., Cleveland, school, **$2,581,650.** CD 9/7—ENR 9/9.

O., Elyria—Elyria Home for Aged, Rev. Chas. B. Hass, supt., hospital. **$150,000.**

O., South Euclid—South Euclid-Lyndhurst Bd. Educ., Grace Albrecht, clk., Mayfield Rd., 10 classroom and cafeteria Brush High School addn. **$250,000**; Bayard Elementary School, **$150,000.** Financing not yet provided for.

★**Okla., Tulsa**—University of Tulsa, Tulsa, new petroleum bldg., administration bldg., field house with necessary equip. **$5,000,000.** Financing not yet provided for.

R. I., Howard—State Dpt. Social Welfare, 40 Fountain St., Providence, brick, steel juvenile research and study, State Clinic Bldg. **$150,000.**

★**Tenn., Memphis**—City Bd. Educ., W. J. Prescott, pres., 317 Poplar St., Hamilton Pub. School addns., **$150,000**; high school, at Wilson and Kerr Sts., **$400,000.** CD 11/5 and 2/14—ENR 11/11 and 2/24.

★**Tenn., Memphis**—City Bd. Educ., J. W. Prescott, supt., 317 Poplar St., plans by Everett Woods, Sterick Bldg., school, Poplar and Holmes Sts. **$600,000.** CD 2/14—ENR 2/24.

★**Tex., Houston** — City, constructing psychiatric and convalescent hospital, **$295,000**, J. Fugate, City Hall, engr.; plans 15% completed by G. R. Blackburn, 2610 Southmore St., 5 health centers, facilities, **$250,000**; plans 25% completed by M. J. Sullivan, 3901 Travis St., 500 bed tuberculosis hospital, **$650,000**, CD 3/26/43—ENR 4/1/43; civic center, **$650,000**, J. Fugate, City Hall, and H. E. Elrod, Petroleum Bldg., engrs.; central library, **$150,000**, CD 4/3—ENR 4/20.

COMMERCIAL BUILDINGS

★**Calif., Pasadena**—Bullock's, Inc., 7 and Bway., Los Angeles, site purchased, plans underway Class A bldg. for department store. **$2,000,000.**

★**Calif., San Anselmo**—San Francisco Theological Seminary, Dr. J. Baird, pres., 140 Belinas Ave., plans underway by J. H. Mitchell, 369 Pine St., San Francisco, men's dormitory, student center bldg., women's dormitory, 5 residences for faculty members, apartment bldg., auditorium and classroom bldg. **$750,000.**

Conn., New Haven—Jewish Center of New Haven, Inc., 7 Dwight St., Jewish Center Home, Chapel St. **$150,000.**

★**Ill., Bloomington** — Illinois Wesleyan University, 210 E. University Ave., preliminary plans underway by Shaeffer & Hooton, Peoples Bank Bldg., student union bldg., **$350,000**; science bldg. on present campus, **$250,000**; 3 story, bsmnt., brick, stone woman's dormitory on present campus. **$150,000** for single unit.

Ill., Galesburg—Knox College, South St. between Cherry and Cedar Sts., fieldhouse on south edge present campus, seating 3,000, incl. swimming pool. **$250,000.**

Ill., Galesburg—Knox College, South St. between Cherry and Cedar Sts., plans completed by Charles R. Hodgdon & Son, 111 W. Monroe St., Chicago, 3 story, bsmnt., women's dormitory, brick, concrete fdn. **$300,000.** Financing not yet provided for.

★**Ill., Harvey** — Young Men's Christian Assn., 19 S. LaSalle St., Chicago, plans by E. B. White, 19 S. LaSalle St., Chicago, 5 story, brick, rein.-con. YMCA bldg. **$800,000.**

Ill., Jacksonville—Illinois College, Turner Library, sketches underway by D. B. Hull, 77 W. Washington St., Chicago, brick gymnasium on present campus. **$175,000.**

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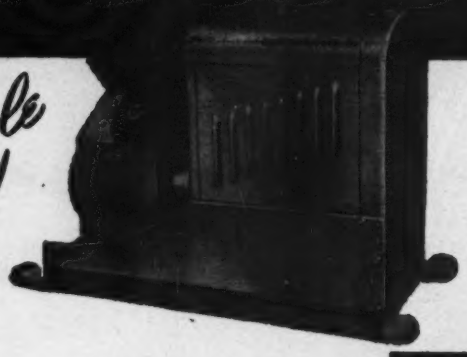

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POSTWAR PROJECTS (Cont'd.)

Ill., Lincoln—Lincoln College, 300 Keokuk St., 2 story, brick science bldg., Keokuk and Ottawa Sts., **$200,000.**

Ill., Peoria—**First** Federated Church, 22[illegible] N. Madison St., church, 2900 block North Sheridan. Over **$150,000.**

Ind., Fort Wayne—Lutheran Hospital, E. C. Moeller, M. D., supt., 3024 Fairfield Ave., plans by Pohlmeyer & Pohlmeyer, 24[illegible] Central Bldg., brick, rein.-con. hospital addn. **$300,000.**

Ind., Indianapolis—Meridian St. M. E. Church, Post War Com., P. Buchanan, chn., 5001 N. Meridian St., preliminary sketches by E. F. Janssen, 740 Rush St., Chicago, Ill., church. **$300,000.**

La., New Orleans—New Orleans Hospital & Dispensary, Jackson Ave., plans 10% completed by W. R. Burk Associated Architects & Engineers, 501 Pan American Bldg., 3 story hospital bldg., dispensary for women and children, **$400,000.** CD 6/28—ENR 6/29 under Public Bldgs.

Me., Houlton—Ricker Classical Institute, High St., plans by A. J. Harriman, 88 Shepley St., Auburn, reconstructing Wording Hall, incl. classrooms, administration offices, laboratory, library and new gymnasium bldg. **$175,000.** Financing not yet provided for. CD 4/7—ENR 4/20.

Me., Waterville—Colby College, F. W. Johnson, pres., Waterville, plans underway by J. Frederick Larson, 27 East Wheelock St., Hanover, constructing Lovejoy Memorial Auditorium, Mayflower Hill. Over **$150,000.**

Mass., Lynn—Young Men's Christian Assn., 85 Market St., bldg. alterations, imprvs. **$250,000.**

Mass., Woburn—Choate Memorial Hospital, 21 Warren Ave., plans by H. E. Davidson & Son, 50 Beacon St., Boston, brick, steel hospital addn., Warren Ave. **$150,000.**

Minn., Minneapolis—Augsburg College, [illegible] St. and 21 Ave. S., B. Christensen, pres., plans by Lang & Raugland, 502 Wesley Temple Bldg., 2 story library and science bldg. **$250,000.** CD 6/21—ENR 7/13.

★**Mo., Clayton (P. O. St. Louis)**—Concordia Seminary, Rev. L. J. Sieck, pres., 801 De Mun Ave., brick, concrete, stone memorial chapel, **$500,000;** synodical office bldg., **$200,000.**

Mo., Kansas City—St. Francis Xavier, Rev. J. B. Gerst, pastor, between 52 and 53 Rd. on Troost St., purchased 100 ft. frontage lot on 52 Rd. for new church.

Mo., St. Louis—S. Komm, 835 S. Hanley Rd., Zone 17, 2,200 seating capacity motion picture theatre bldg., on 2 acre tract, Hampton Ave. between Bancroft and Sutherland Aves., Zone 9, to Stamm Constr. Co., 7351 Flora St., Maplewood, St. Louis, Zone 17. Est. **$200,000** plus with equip. Missouri Amusement Co., c/o H. C. Arthur, Jr., Fox Theatre Bldg., Grand and Washington Blvds., Zone 3, lessee. A. F. and A. Stauder, 5410 Holly Hills Ave., St. Louis, Zone 9, archts. CD 6/2—ENR 6/5.

★**N. H., Hanover**—Dartmouth College, W. W. Gooding, supt. Bldgs., Hanover, plans underway by J. Frederick Larson, 27 E. Wheelock St., college unit, physics, college grounds, **$1,000,000;** plans completed by J. Frederick Larson, 27 East Wheelock St., 1 story, foyer, brick theater-auditorium, seating 3,500 persons, **$900,000.**

N. H., Tilton—Tilton Junior College, Dr. J. E. Coon, pres., plans 50% completed by Alfred T. Granger Associates, Main St., Hanover, school, administration bldg., field house, 23,000 sq. ft. swimming pool. **$165,000.** CD 5/9—ENR 5/18.

N. J., Union—Connecticut Farms Presbyterian Church, Stuyvesant Ave., 1 story, rear church addn., also Sunday School Bldg. addn., etc. **$150,000.**

N. Y., Jamestown—Abrahamson-Bigelow Co., W. 3 St., plans by Beck & Tinkham, Bailey Bldg., altering, imprv. 6 story, bsmnt. dept. store and constructing 2 story, bsmn. addn., W. 3 and Washington Sts., **$200,000** or more.

★**O., Cincinnati**—Willis Vance, 2442 Stettinius Ave., plans completed by F & Y Bldg. Service, 4216 E. Broad St., Columbus, 1 story, 200x400 ft. brick, concrete, steel bldg. to be used as convention hall, athletic stadium and sports arena. **$950,000.**

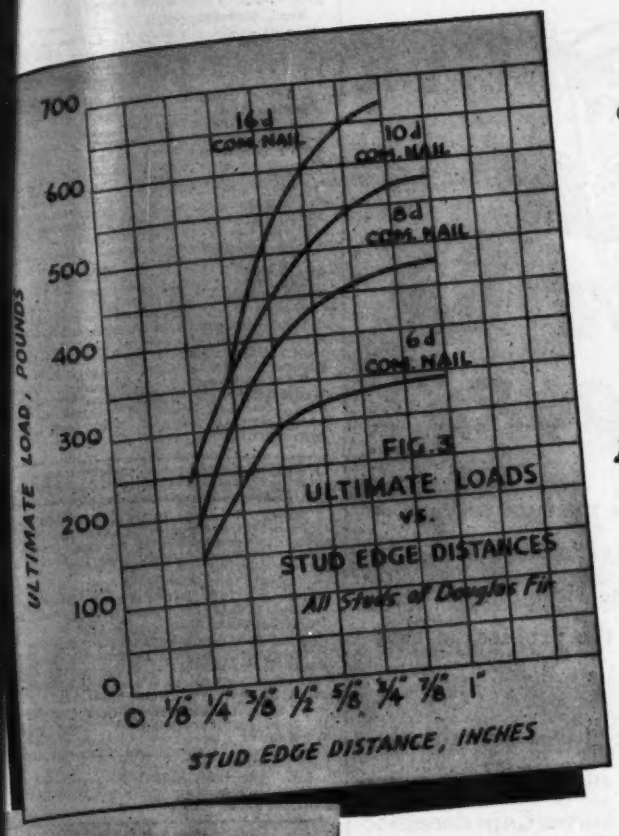
R. I., Providence—People's Savings Bank, Providence, plans by Cram & Ferguson, 248 Boylston St., Boston, Mass., 2 story, brick, stone bank, Exchange Pl. Over **$150,000.**

★**Tenn., Memphis**—Chandler & Chandler Real Estate, Porter Bldg., 175 dwellings, sewers, streets. **$1,400,000.**

Tex., Austin—Driskill Hotel, Austin, plans 5% completed by Geo. L. Dahl, Southland Life Bldg., Dallas, expansion, imprv. hotel. Over **$150,000.**

Tex., Dallas—A. Harris & Co., Main and Akard Sts., plans underway by G. L. Dahl, Southern Life Annex Bldg., two 6 to 10 story bldg. addns. To exceed **$150,000.**

★**Tex., Houston**—I. S. Deutser, 2614 Wichita St., and Loraine Priester, 908 Jackson St., Houston, and Associates, 20 story, 200 unit apartment bldg., on Alameda Rd. **$1,500,000.** K. Franzheim, 2306 Crawford St., archt. CD 1/31—ENR 2/10.



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POSTWAR PROJECTS (Cont'd.)

Tex., Houston—Mrs. L. B. Priester & Associates, 4702 Caroline St., plans 18½ completed by Kenneth Franzheim, 2306 Crawford St., community shopping center, 1½ acre paved parking zone. $250,000. C 7/6.

★**Tex., Houston**—Syndicate, c/o R. Schneider & Co., archts., 520 W. St., sketches completed oil center, 2,500 ft. welded steel tower, petroleum museum, petroleum institute and other oil position bldgs., etc. $25,000,000.

★**Tex., Laredo**—H. B. Zachry, P. O. 596, San Antonio, plans underway R. M. Ayres & G. M. Baker, Smith-You Bldg., San Antonio, 2,500 residences, 300 sq. yd. street paving, 365,000 sq. ft. walks, 124 acres park area, 68,000 ft. wat lines, 76,000 ft. sewers, 64,000 ft. gas mai $4,125,000.

Tex., San Antonio—Presbyterian Church 402 N. Alamo St., 2 church units, chap educational and main church bldg., $150,

Wis., Greenfield (P.O. Milwaukee)—Sch Sisters of St. Francis of St. Joseph's Co vent, 1501 S. Layton Blvd., Milwaukee, pu chased 80 acres land for large hospital

Wis., Milwaukee — Milwaukee Children Hospital, 721 N. 17 St., Mrs. Wm. C. Fre chn., nurses' home or contagious dise unit, central heating plant and laund Site purchased.

INDUSTRIAL BUILDINGS

Mass., Everett—TRUCK GARAGE, etc.—Colonial Beacon Oil Co., 30 Beacham St., plans underway truck garage, service st tion, storage facilities, Bway. and Raymon St. $50,000.

Mo., St. Louis—FLOUR MILL—Baur Flo Mills Co., 7020 South Bway., Zone 11, pu chased 170x124 ft. site for flour mill addn 7000-12 South Bway.

Mo., St. Louis—PLANT—Concordia Pub lishing Co., R. C. Obermann, pres., 12 South Jefferson Ave., constructing, comple ing addnl. story on 3 story publishing plan bldg. $40,000 with equipment.

N. C., Charlotte—DISPLAY BLDG., etc.—H. & S. Lumber Co., J. F. Heinz, pres., 4 Winona St., bought 9 acres land Dowd R and Merriman Ave., and plans display bld and office.

Pa., Warren—REFINERY—United Refi ing Co., Box 780, crude oil refinery addns imprvs. Over $100,000.

UNCLASSIFIED

★**Ill., Galesburg** — AIRPORT — City, City Hall, sketch plans underway airport run way exten. of 3,000 ft. on each of 2 presen runways, new hangar with reception center to be included inside. $500,000. A. O. Nord hielm, city engr.

★**Ind., Indianapolis**—CEMETERY—Crown Hill Cemetery, Bd. Mgrs., J. J. Daniels pres., 3402 Boulevard Pl., preliminary plans mausoleum, chapel, crematory and colum barium covering circular area 550 ft., stone rein.-con., steel, marble and tile, containing 30,000 crypts. $5,000,000. D. A. Hohlen & Son, 1001 Farm Bureau Bldg., archts.

Mass., Boston—RADIO BROADCASTING STATION—American Telephone & Tele graph Co., 50 Oliver St., radio broadcasting station. Over $25,000.

★**N. J., Secaucus**—RACETRACK—Hudson Racing Assn., 120 N. Bway., Camden racetrack, $2,500,000-$3,000,000.

New York—BEACH IMPROVEMENTS—State Dpt. P. Wks., State Office Bldg., Albany, plans underway beach imprvs., Sunken Meadows Park, Suffolk Co. $50,000.

New York—DAMS—Dpt. P. Wks., State Office Bldg., Albany, plans underway 2 dams at Flowed Land Lake, Essex Co. $30,000

New York—GAS STATION—Dpt. P. Wks., State Office Bldg., Albany, plans underway gas station at Jones Beach State Park, Nassau Co. $35,000.

New York—GOLF HOUSE—State Dpt. P. Wks., State Office Bldg., Albany, plans un derway, golf house at Fairhaven Beach State Park, Cayuga Co. $55,000.

N. Y., Flushing—FIELD HOUSE—Dpt. Parks, Arsenal Bldg., 64 St. and Central Park, New York, plans completed field house in Alley Pond Park, east of Cross Island Parkway, $27,992. A. Embury II, 150 E. 6 St., New York, Zone 21, archt.

N. Y., Hudson—HEATING and ELECTRIC SERVICE CONNECTIONS—Dpt. P. Wks., State Office Bldg., Albany, plans underway replacing, exten. heating and electric serv ice connections. $219,000.

★**Tex., Houston** — AIRPORT IMPROVEMENTS—City, municipal airport drain age, $300,000, L. Fugate, City Hall, engr. exten. airfield runways to 5,000 ft., $150,000 and imprvs., incl. shop, hangars, ground development, lighting, utilities, etc., $475,000 J. M. Nagle, City Hall, engr.

★**Tex., Houston**—ZOO—City, City Hall, zoo imprvs., $650,000. J. Fugate, City Hall and H. E. Elrod, Petroleum Bldg., engrs. CD 6/14/43—ENR 6/17/43.

CONSTRUCTION REPORTS

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager — *SCOTT McLEOD, Statistics* — *J. A. MAHONEY, Reports*

(Daily service also available—Write for details)

WATER SUPPLY

POSED WORK

Ala., Huntsville—Making plans new water ification plant sys. $300,000. Polglase & senberg, 1st Natl. Bldg., Birmingham, gers.

Colo., Denver—City, 3,500,000 gal. rein.- con. box type Capitol Hill Reservoir, 00; 5 m.g. rein.-con. box type filtered ter reservoir at Moffat Filter Plant, $116,- ; pipe sys. extens., $319,000.

Colo., Oak Creek — City, exten., imprv. ter sys. $30,000-$35,000. Burton Lowther, Colorado Bldg., Denver, engr.

Ill., Galesburg—City, plans completed 12 watermain exten. from North St. to exist- elevator tank and wells, Florence and ish Aves. $40,000. **FWA.** A. O. Nord- lm, City Hall, city engr.

Ill., Springfield—City Water & Light Co., y Hall, new boiler unit in existing plant, ke Side Plant, 5 mi. southeast of here. 2,000. Burns & McDonnell Eng. Co., 7 Linwood Blvd., Kansas City, Mo., engrs.

Md., Baltimore—City, City Hall, making plans 29,000 ft. pipeline from Hollofield Patapsco River connecting with tunnel at erty Rd. and city line. $5,100,000. CD 6—ENR 2/10, under Postwar Projects.

Mass., Leominster — City, M. La Pierre, ayor, City Hall, water filtration plant, culators and generator. $15,000. Howard ley, 177 State St., Boston, engr. CD 7—ENR 6/15.

Mass., Pittsfield—City, Supt. Water Dpt., aking preliminary surveys water sys., col- ting, storing and distr. facilities. Over 5,000. Metcalf & Eddy, 1300 Statler Bldg., ston, engrs.

Okla., Calumet—Voted bonds, new WW $35,000. I. D. Cates, mayor.

R. I., West Warwick—Pawtucket Valley ater Co., 1072 Main St., plans completed, ds soon water sys., 14,000 ft. 12- to 16-in. pelines. Over $15,000. Jenks & Ballou, 00 Industrial Trust Bldg., Providence, grs.

S. C., Florence—City, R. F. Zeigler, ayor, City Hall, making plans WW sys. ten., S.C. 249. $35,000. **FWA.** Tomlinson g. Co., 1226 Sumter St., Columbia, engr.

S. C., Spartanburg—City, J. L. Thompson, ayor, City Hall, making plans WW sys., C. 32-245. $170,000. **FWA.** Wiedeman & gleton, Candler Bldg., Atlanta, Ga., engrs.

Tex., Houston—San Jacinto Water Proj- ect, making surveys dam across San cinto River to supply water for defense ants and permanent industries of Houston, 000,000. G. L. Fugate, City Hall, design gr.

B. C., Vernon—Municipality, imprv. water e. $35,000. Will be submitted to rate- ayers.

N. S., Halifax—Municipality, exten. auto- atic chlorinating plant and meter house at ah Lake. $50,000. R. M. MacKinnon, ty Hall, engr. and comr. works.

DS ASKED

Bids Asked August 3

N. Y., New York—Comr. Water Supply, s & Electricity, Municipal Bldg. Zone 7, uling, laying watermains, appurtenances aside Ave. and Greenwood Ct., 5th Ward, eens Boro. Plans deposit $1.

OW BIDDERS

Calif., Los Angeles—Los Angeles City Dpt. Water & Power, 207 S. Bway., Los geles, July 21, reconditioning, laying, rtar lining 36 in. steel pipe (furnished by ner), San Pedro, from American Pipe Constr. Co., 4625 Firestone Blvd., South te, $116,297. CD 6/14—ENR 6/22, under n Pedro.

Md., Baltimore—Bd. Awards, July 14, rnishing, del. c.i pipe, fittings to Bureau ater Supply, from U. S. Pipe & Foundry Liberty Lincoln Bldg., Phila., Pa., 0,000. CD 7/7—ENR 7/13.

Tex., Houston—City, M. H. Westerman, ec., July 12, 12 in. c.i. watermains in urora St., 8 in. in 16, Stokes and Prince s., 6 in. in 13 St., from R. P. Farnsworth, ankers Mortgage Bldg., $54,447. Bids 7/14.

ONTRACTS AWARDED

Ga., Warner Robins—Pub. Housing Auth., HA, Georgia Savings Bank Bldg., Peachtree d Broad Sts., Atlanta, water tank, rein.-con., to service housing, to Loftis Plumbing & Heating Co., 45 Mangum St. S.W., Atlanta, $84,214. A. L. Lindstrom, Mortgage Guarantee Bldg., Atlanta, engr.

†Okla., McAlester—W. Jones, mayor, water facilities, Contr. 1, Okla. 34-194 N, to Ottinger Bros. Co., Petroleum Bldg., Oklahoma City, $338,110. Est. $250,000, incl. grant. **FWA.** Bids 7/17, awarded 7/17. CD 6/30—ENR 7/6.

†Tex., Killeen—Town, water imprvs., Tex. 41-548, to M. F. Fisher & Son, 1412 Milam Bldg., San Antonio, $23,149. **FWA.** Bids 7/17. CD 6/29—ENR 7/6.

Tex., Mount Pleasant—Town, WW imprvs., to Swindell & McDonald Bros., 5607 Morningside St., Dallas, approx. $15,000. D. G. Nolte, McDonald Hotel, engr. CD 7/3.

Wash., Pinehurst—Pinehurst Water Dist. 1, WW, to Paine & Gallucci, 1521 S. Grant St., Tacoma, $28,192. Awarded 7/10.

Ont., Ravenswood—Dpt. National Defense (Army), Ottawa, water supply at Camp Ipperash Advanced Training Centre, to Chatham Dredging & General Contg. Co., Ltd., Chatham; lakeshore intake, etc., to Considine, Reid, Ltd., Windsor. Est. $42,000.

Location of ENR Correspondents

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily
A-E-M Architect-Engineer-Management type of contract

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Named in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads); BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Ala., Mountain Brook — City, C. Webb, mgr., bids soon sanitary and storm sewers. $300,000. J. W. Goodwin Eng. Co., Martin Bldg., Birmingham, engrs. CD 7/3—ENR 7/6.

Calif., El Sobrante—San Pablo Sanitary Dist., F. Carifield, secy., Firehouse, bids soon sewer imprvs. in Assessment Dist. 18. $257,000. P. R. Jones, 2429 MacDonald Ave., Richmond, dist. engr.

†Conn., Bridgeport—City, F. Schwarzkopf, clk. Hy. Comn., City Hall, sanitary sewers, Nichols and Kossuth Sts., Stratford Ave., Contr. 13, Conn. 6-107. $100,000. **FWA.** H. L. Rowland, City Hall, city engr. H. K. Gately, Maplewood, N. J., consult. engr.

Ia., East Omaha (mail RFD from Omaha, Neb.)—D. R. Hill, town clk., sewage plant. $44,000. Seeking FWA funds. Henningson Eng. Co., Standard Oil Bldg., Omaha, Neb., engrs.

★**Md., Baltimore**—City, City Hall, making plans sewage disposal plant exten. $1,000,000. Geo. E. Finck, Municipal Office Bldg., sewerage engr.

Mich., St. Joseph and Benton Harbor—Cities, twin city sewage disposal plant and intercepting sewers. Consoer, Townsend & Quinlan, 211 W. Wacker Dr., Chicago, Ill., archts.

O., Cambridge—Village, sewage disposal plant, trunk line sewers, activated sludge, mechanical aeration, 2 lift stations, $276,000. Applying for FWA funds. Floyd E. Browne & Associates, Marion, sanitary engrs. P. Sheehan, city engr. CD 6/27—ENR 6/29.

Tex., Taylor—$35,000 bond election Aug. 22, incinerator. H. G. Richards, city mgr.

Wis., Appleton—Outgamie Co., sanitary sewers from county asylum to city of Appleton sewerage sys., 8,000 ft. 8 in. c.i. pipe, 1,100 ft. 12 in. gravity sewer, pump house, sewage pumps. McMahon Eng. Co., Menasha, engr.

Man., Winnipeg—Municipality, 2 incinerators to eliminate dump at Elmwood and Saskatchewan Ave. $90,000. CD 4/5—ENR 4/13.

N. S., Halifax—Municipality, exten. sewer to Laurence Sub-division on Gottingen St., known as Merson Farm. $25,750. R. M. Mackinnon, City Hall, engr. and comr. Works.

Ont., Ottawa — Municipality, incinerator. $100,000. Dominion permit granted. F. C. Askwith, Transportation Bldg., engr. and comr. Works.

Que., Montreal — Municipality, J. A. Mongeau, clk., sewer in Snowden Ave. Over $25,000. H. A. Gibeau, City Hall, engr. and dir. P. Wks.

BIDS ASKED

Bids Asked July 31

Conn., Groton—Borough, Bd. Warden & Burgesses, 359 Thames St., sanitary sewers. $25,000. Plans deposit $10. L. E. Daboll, 154 State St., New London, engr.

Bids Asked August 3

Ill., Chicago—James M. Whalen, Sanitary Dist. of Chicago, 910 S. Michigan Ave., vertical plate diffuser sys. at Southwest Sewage Treatment Works, Contr. 44-40 SW-P.

N. Y., Brooklyn—President Brooklyn Boro., Boro Hall, Zone 2, storm and sanitary sewers Avenue R, E. 32, E. 33, E. 31, E. 34, E. 35 Burnett, Stuarts Sts., Madison Pl.; combined sewers E. 88 St.; grading Avenue R, Madison Pl.

Pa., New Castle — City, E. Brown, clk., City Hall, Div. 1, 3,300 ft. 48 in. and 130 ft. 36 in. rein.-con. vert. fall sewer; Div. 2, By Pass sewer repairs; Div. 3, post chlorination bldg. equip. John Z. Street, city engr. Havens & Emerson, 1140 Leader Bldg., Cleveland, O., consult engrs. CD 7/12—ENR 7/20.

Bids Asked August 4

O., Ravenna—City, H. A. Akers, ser. dir., City Hall, sewage treatment plant, Contr. 2. Bids 7/7 rejected. Floyd Brown & Associates, Marion Bldg., Marion, engrs. CD 7/20—ENR 6/29.

Bids Asked August 21

Pa., Titusville—City, Geo. W. Becker, clk., City Hall, 35-ton incinerator plant; adv. ENR 7/27.

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SEWERS, etc. (Bids Asked, Cont'd)

Bids Asked August 29

†**N. Y., Canandaigua** — Veterans Admin., Vermont Ave. between R and I Sts. N.W., Wash. 25, D. C., sewage disposal plant.

LOW BIDDERS

Calif., Los Angeles — Bd. Supervs. L. A. Angeles Co., July 18, sanitary sewers in Quinn St., et al, C. I. 1085, from Bebek & Brkich, 238 W. Florence Ave., $71,389. CD 6/27—ENR 6/29.

Calif., Los Angeles — Bd. Supervs. L. A. Angeles Co., July 18, sanitary sewers in Santa Ana Blvd. and other streets, C. I. 1067, from Artukovich Bros., 7320 N. Atlantic Blvd., Hynes, $48,163. CD 6/21—ENR 6/29.

Ill., Chicago—Sanitary Dist. of Chicago, 910 S. Michigan Ave., July 13, Contr. 44-SW-M, stack alterations, Southwest Sewage Treatment Works at Stickney, from Asbestos-Magnesia Materials Co., 122 N. Peoria St., $30,800.

Ind., Fort Wayne—Bd. P. Wks., City Hall, July 17, 1¼ mi. 12- to 42-in. Beaver-Oakdale Interceptor Sewer, from Weikel Const. Co., 1150 Fairfield Ave., $107,798. Est. $100,000. City Utilities, Wayne Kehoe, 300 Berry St., ch. engr.

†**Me., Portland**—Federal Works Agency, 99 Chauncey St., Boston, Mass., July 17, sewer Bishop St. and Warren Ave., M. 17-163, from I. Capaldi & Sons, Inc., Silver Springs St., Providence, R. I., $57,... CD 7/5—ENR 7/13.

Md., Baltimore — Bd. Awards, sewer Contr. 338, from John L. Sullivan, 618 34 St., $141,500.

†**Miss., Petal** — Federal Works Agency, Candler Bldg., Atlanta, Ga., July 18, 33,... lin. ft. 8- to 12-in. sewers, Miss. 22-146-... from J. Allen Bradford, Biloxi, $57,... $70,000. Plans deposit $20. R. T. Myers, 604 Carter Bldg., Hattiesburg, engr.

Tex., Houston — City, M. H. Westerman, secy., July 19, storm sewers, E. 23, Ya... Harvard, Cortland, E. 23, Columbia and C... ford Sts. from J. Hefferman, Jr., 18... Charleston St., $104,117. CD 7/14.

Tex. Houston — City, M. H. Westerman, secy., July 12, sewerage treatment plant at Simms Bayou, Imhoff tank, inlets, outlines, sludge drying beds, masonry structures from Gayle Bros., 804 Blodgett St., $82,1... Bids 7/12. CD 7/5; 60 in. sanitary sewer trunk line in Milby Park Dr. and Pasa... Terrace Blvd. from Simms Bayou treatment plant to Bway. Blvd., from R. P. Parks... worth, Bankers Mortgage Bldg., $548,800.

CONTRACTS AWARDED

N. J., Glen Gardiner—State, Dpt. Institutions & Agencies, W. Hanover St., Trenton, addns., alterations sewage disposal plant, sys., to Newton A. K. Bugbee & Co., 204 W. Hanover St., Trenton, $25,875.

BRIDGES

PROPOSED WORK

Kentucky—State Hy. Dpt., Frankfort, bridges over Cumberland River. $400,000.

Minnesota—State Hy. Dpt., St. Paul, Minn., soon bridge over Mississippi River, at Brooklyn Center. Over $100,000.

Missouri—State Hy. Dpt., Jefferson City, rejected bids July 7, rein.-con. deck girder span bridge, Buchanan Co. CD 7/13—ENR 7/20, under LB.

Neb., Omaha—Douglas Co., repairing, re... building bridges. $175,000.

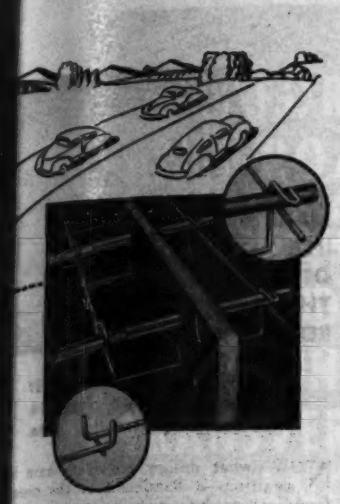
Pennsylvania—State Dpt. Hys., Harrisburg, abolition 2 grade crossings where Route 62128 crosses Waynesburg and Washington R. R., constructing new grade crossing where Route 62102 as relocated will cross railroad, incl. grading, draining, paving, also constructing concrete hy. bridge over Bates Fork of Browns Creek, to replace covered bridge, Washington Co. $35,620.

BIDS ASKED

Bids Asked August 1

Indiana—State Hy. Comn., S. C. Haddon, chn., Indianapolis, cleaning, painting, new concrete floors and sidewalks and hand rails, 6 span, 703 ft. steel girder bridge incl. 4... ft. roadway, two 8 ft. walkways, over Wabash River, Main St., Contr. 3522 Tippecanoe Co., Plans deposit $2.75; constructing 3 span steel beam bridge with timber floor and handrail over Sinkum Ditch, 1.2 mi. west of Waverly. Contr. 2526, Morgan Co. Plans deposit $1.75; repairs, cleaning, painting, new concrete floors, 6.17 mi. approach grading and paving four 720 ft. span steel truss bridge over Wabash River, Contr. 3527, Vermilion Co., Plans deposit $2.75.

West Virginia—State Road Comn., D. M. Claugherty, secy., Charleston, Tanner Creek Bridge No. S-1691 and approaches, one 7... ft. span concrete rigid frame, and grading, drainage, macadam base and surface treatment (Secondary Routes 7 and 20), W... Emergency Relief Proj. 5-B(1), Gilmer Co. Superior Bridge 1598, four 58 ft. concrete deck girder spans on concrete substructure over Elkhorn Creek, FAP FA 309-D(1), (U.S. Route 53), McDowell Co.



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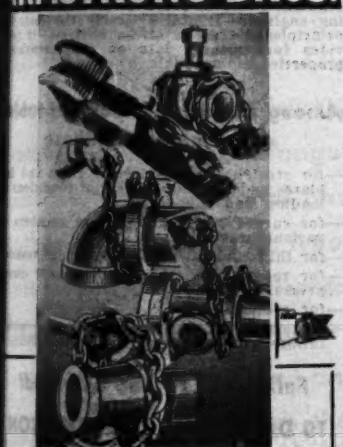

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BRIDGES (Bids Asked, Cont'd.)

Bids Asked August 5

Que., Bishopton—L. G. Harrison, municipal-ly clk., rein.-con. bridge, approaches. Over $25,000. Dpt. P. Wks., Quebec City, engr.

Bids Asked August 7

Miss., Yazoo City—Bd. Suprvs. Yazoo Co., reconstructing Cessna Bridges, 4 spans and 4 bents; Martin Bridge, 6 spans, 4 bents; Tcheve Bridge one 19 ft. timber span, one 61 ft. steel I-beam span with timber deck. $25,000. Plans deposit $10. J. B. Williams, Yazoo City, engr.

New Jersey—Spencer Miller comr. State Hy. Dpt., Trenton, reconstructing culvert at East Riser Ditch, Route 6, Sect. 1-F, Boroughs of Little Ferry and Teterboro, Bergen Co. Plans deposit $10.

Bids Asked August 16

Louisiana—State Dpt. Hys., Baton Rouge, bridge over Bayou Black on Morgan City-Houma Hy., State Route 3, at Gibson, Terrebonne Parish. Plans deposit $7. D. Y. Smith, dir.

LOW BIDDERS

Alabama—State Hy. Dpt., Montgomery, July 7, swing span type bridge, grading, draining, bituminous paving approaches (bridge span 0.234 mi.) on Intercoastal Canal between Foley and The Gulf Shores, Baldwin Co., from Royce Kershaw, Montgomery, Proposal B, $149,942. Est. $200,000.

CONTRACTS AWARDED

Missouri—State Hy. Comn., Jefferson City, repairing, strengthening steel, timber bridge, Washington Co., own forces, $75,000. C. W. Brown, ch. engr.

Oregon—State Hy. Comn., Salem, painting Coos Bay Bridge, Oregon Coast Hy., at North Bend, Coos Co., to A. H. Barber & Son, Bd. of Trade Bldg., Portland, $38,500. Awarded 7/12.

STREETS AND ROADS

BIDS ASKED

Bids Asked July 31

N. J., Hammonton—Town, 28,550 sq. yd. gravel surfacing 2 Rd. and 15 St., Sects. 1 and 2, Adams & Rehmann, 305 Central Ave., engr.

N. J., Morris—Town, Type A or T macadam surfacing, 13,000 lin. ft. concrete curbing Western Ave., Sects. 2 and 3. Over $25,000. Raymond Sharp, 16 W. Blackwell St., Dover, engr.

Bids Asked August 1

Indiana—State Hy. Comn., S. C. Haddon, chn., Indianapolis, bituminous concrete resurfacing, widening 0.608 mi. Tibbs Ave. from Washington and Vermont Sts., Contr. 2521, Marion Co. Plans deposit $3.25; drainage for existing C. & E. I. R. R. subway under state Rd. 41, 54 in. rein.-con. pipe, Contr. 2523 Parke Co. Plans deposit $1.25; rein.-con. pavement and resurfacing 5.617 mi. State Rd. 24 from New Haven to the northeast, Contr. 2328, Allen Co. Plans deposit $5.75, bids 7/7 rejected. CD 7/11—ENR 7/13, under I.B. R. Bower, ch. engr.

N. Y., New York—President Bronx Boro, 851 Grand Concourse, Zone 51, sheet asphalt on concrete, repaving Monroe Ave., Union and Valentine Aves., brick and sheet asphalt on concrete, repaving Mt. Hope Pl.

O., Cincinnati—City, City Hall, concrete repaving Madison Rd. from Woodburn to Elmhurst Aves. $27,700. H. H. Krang, City Hall, engr.

Oklahoma—State Hy. Comn., B. T. Childers, chn., Oklahoma City, blended rock asphalt surface course on 3.6 mi. SH 2 from Atoka-Pushmataha Co. line and exten. east, Proj. MC 55 (1944), Pushmataha Co. $24,307.

South Carolina—State Hy. Dpt., J. S. Williamson, comr., Columbia, grading, bituminous surfacing 0.814 mi. road from Pine Log Rd. to Ancor Corp. Kaolin Pit, S.C. Docket No. 2,242, Defense Access Proj. DA-RM 37-A (1), Aiken Co.; asphaltic concrete on macadam paving 0.695 mi. approaches to Santee Tailrace Canal bridge near Moncks Corner, S. C. Docket No. 8.257, F. A. P. 63-A (2), Berkeley Co.

West Virginia—State Road Comn., D. McClaugherty, secy., Charleston, surface treatment 2.9 mi. Russellville to SS 60 Rd. Defense Access Raw Material, Army Proj. DARM-41-A (1), Item 28, 2.38 mi. U.S. Route 60; Clifftop Road, Defense Access Raw Material, Army Proj. DARM-41-A (1), Item 29, both Fayette Co.; road mixed surfacing 2.25 mi. Batoff Creek to Stanaford Post Office (State Route 41), Defense Access Raw Material, Army Proj. DARM-41-A (1), Raleigh Co.

Bids Asked August 2

Michigan—State Hy. Dpt., Lansing, 3,766 sq. yd. 8 in. uniform concrete paving patching on M-46, U.S. 27 and U.S. 27A, Mm 29-15C-2, Mm 37-9-C-4, Mm 29-17C-3, Gratiot and Isabella Counties; placing ⅜ mi. bituminous concrete on existing concrete and double seal non skid surface treating Mm 82-25-C-2 on M 97 from Eight Mile Rd. to Gratiot Ave., Wayne Co.; concrete paving 1.5 mi. M-46-31C-2 on M-50, Ridgeway west

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6	2.5	3.00	2.25	11.71
8	2.5	4.00	2.25	14.63
10	2.5	5.00	2.25	17.70
12	2.5	6.00	2.25	20.86
14	2.5	7.00	2.25	24.02
16	2.5	8.25	2.25	33.07
18	2.5	9.25	2.25	36.88
20	2.5	10.50	2.25	40.71
24	2.5	13.00	2.50	53.02
30	2.75	16.00	2.50	65.36
36	2.75	19.00	2.50	77.96
48	3.50	30.00	3.00	121.15
54	4.0	38.00	3.00	135.60
60	4.0	42.00	3.00	150.70

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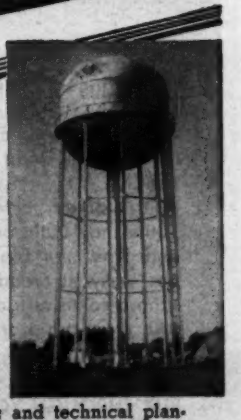

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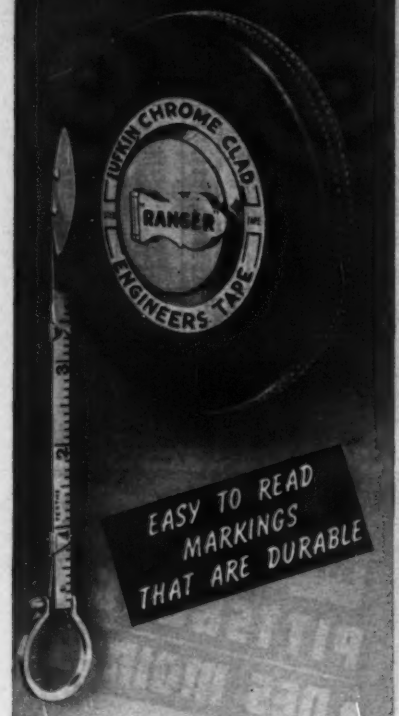

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STREETS, etc. (Bids Asked, Cont'd.)

to Britton, Lenawee Co.; 4.765 mi. M-46-42C-1 on M-50, Lenawee Co. Plans deposit $3 ea. project.

Bids Asked August 2

Louisiana—State Dpt. Hys., Baton Rouge, shaping roadway, gravel surfacing, draining, etc. 134.8 mi. S.P. 737-00-05(Contr. 2) Vernon Parish, 99.4 mi. S.P. 737-00-02 (Contr. 3), Natchitoches Parish. D. Y. Smith, dir.

†**Md., Indian Head**—Pub. Roads Admin., 15 and F Sts. N.W., Wash., 25, D. C., access roads to Naval Powder Factory, Proj. MD-DA-NR-4F3. Plans deposit $10.

Bids Asked August 4

Alabama—G. R. Swift, dir. State Hy. Dpt., Montgomery, grading, drainage, single surface treating, seal on 3.152 mi. Selma-Maplesville Rd., S.P. 8-23-D, Dallas Co.

Minnesota—State Hy. Dpt., St. Paul, gravel base, bituminous wearing surface 3.7 mi. S. P. 0908-24 (TH 75-6), S. P. 7805-2 (TH 76-6 and S. P. 0605-06, Plans deposit 90c.; 6.5 mi. S. P. 2611-02 (TH 59-3) S. P. 2609-05 (TH 55-142) S.P. 2609-06 (TH 55-142) and S.P. 2609-07, (TH 55-142), Plans deposit $5; 8.3 mi. S. P. 5610-03, (TH 29-29) S. P. 5609-02 (TH 29-29), Plans deposit $2.25; 5.1 mi. S. P. 1107-06 (TH 34-34) and S. P. 1104-09, (TH 6-34), Plans deposit 35c.; 20 mi. S. P. 6919-28 (TH 53-11) and S. P. 6917-13 (TH 53-11), Plans deposit 90c. O. L. Kipp, St. Paul, ch. engr.

Bids Asked August 3

Florida—State Road Dpt., Tallahassee, applying bituminous surface retreatment 4.936 mi. Rd. 4, between Bunnel and point southeast S.P. 7301-901, Flager Co., reworking and widening existing lime rock base, constructing bituminous retread surfaces, relaying existing brick pavement applying bituminous mineral seal coat, etc., 1.414 mi. Rd. 4 in St. Augustine, St. Johns Co., $35,000; concrete widening strips, bituminous retread surface course on 1.559 mi. Rd. 1, between Suwannee River and point west, S.P. 3502-105, Madison Co., bituminous retread surface on 1.586 mi. Rds. 1 and 50 in Live Oak, Suwannee Co., $45,000; applying bituminous retreatment 1.193 mi. Rd. 15, in New Port Richey, S.P. 1403-901, Pasco Co., 1.002 mi. Rd. 15 in Clearwater, Pinellas Co., 4.496 mi. Rd. 230, in St. Petersburg, Job 1509-103, Pinellas Co., 6.63 mi. Rd. 232, between Rds. 263 and 15, Job 1510-107, Pinellas Co., $75,000; widening strips of lime rock base with bituminous mineral seal coat 8.306 mi. Rd. 2, between Micanopy and Gainesville, S.P. 2601-103, Alachua Co., $50,000; reworking, widening existing lime rock base, constructing bituminous retread surface course on 16.56 mi. Rd. 5, S.P. Jobs 2602-105 and 2414-103, Alachua and Levy Counties, $226,000; local rock base with bituminous sand seal surface 1.6 mi. Rd. 496, from Rd. 143 to Farmers Market in Pahokee, Palm Beach Co., $30,000. J. H. Dowling, state hy. engr.

Bids Asked August 9

California—State Div. Hys., Sacramento, repairing with imported borrow material 10 mi. between Knights Landing and Grimes, Yolo and Colusa Counties. G. T. McCoy, state hy. engr.

Louisiana—Dpt. Hys., Baton Rouge, shaping roadway, gravel surfacing, drainage structures 186.7 mi. Defense Access Army Reservation Project DA-WR 500 (1), S.P. 737-00-04 (Contr. 3), Sabine Parish; 133.9 mi. Defense Access Army Reservation Project DA-WR 500 (1), parish roads in 90% Maneuver area, S.P. 737-00-05, Contr. 3, Vernon Parish.

Bids Asked

Missouri—State Hy. Dpt., Jefferson City, rejected bids July 7, imprv. 0.568 mi. Buchanan Co. CD 7/12—ENR 7/20, under LB.

North Carolina—State Hy. & P. Wks. Comn., Raleigh, rejected bids July 6, imprv. 1.11 mi. Rowan Co. Under $15,000. CD 6/30.

LOW BIDDERS

California—State Div. Hys., Sacramento, July 19, imprv. 4.2 mi. Placer and Nevada Counties, from Westbrook & Bing, 204 23 St., Sacramento, **$39,645.** CD 7/6.

Ill., Princeton—City, July 14, bituminous concrete paving 1.8243 mi. Proj. 7-CE, from Crowley-Sheppard Asphalt Co., 12 Ave. and 19 Sts., Broadview, **$54,895.** CD 7/5.

Louisiana—State Dpt. Hys., Baton Rouge, July 19, imprv. 151.7 mi. Natchitoches Parish, from Carruth Contg. Co., Inc., La. Natl. Bldg. **$108,864***10.4 mi. Rapides Parish from R. M. Lilly, 1255 Ingleside Dr., Baton Rouge, **$130,411***143 mi. Sabine Parish, from Reynolds & Sutton, R. M. Lilly & Barber Bros., 1255 Ingleside Dr., Baton Rouge, **$150,450.** CD 7/11—ENR 7/13.

Mass., Boston—Dpt. P. Wks., City Hall. July 20, sheet asphalt paving Columbus Ave. and New Heath St., from Baker & Co., 1235 Hyde Park Ave., Hyde Park, Boston, **$30,915.** CD 7/13

Mass., Boston—Dpt. P. Wks., City Hall. July 21, bituminous concrete paving Adams St., et al, from M. De Matteo Constr. Co., 71 Blue Hills Parkway, Milton, bituminous concrete base **$33,563.** CD 7/13.

Mass., Boston—City, P. Wks. Dpt., July 17, imprv. Brewer St., et al, from M. De Matteo Constr. Co., 71 Blue Hills Parkway, Milton, **$28,064.** CD 7/5—ENR 7/13, under Jamaica Plains.

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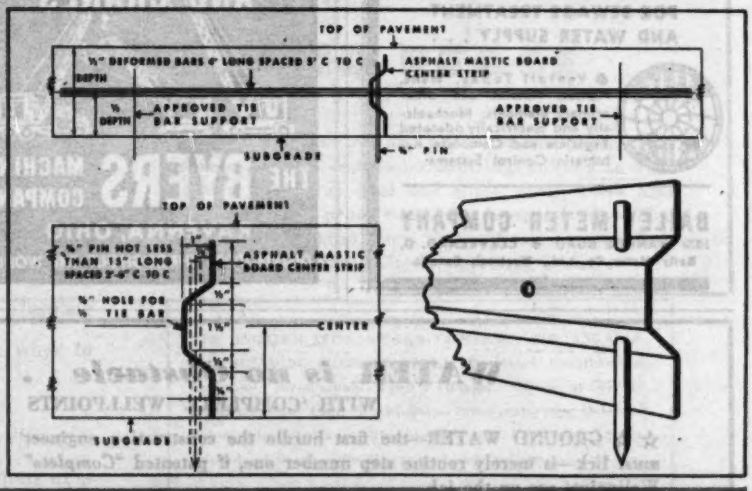
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STREETS, etc. (Low Bidders Cont'd.)

Mass., Boston—City, July 12, sheet asphalt paving Beech St., et al, from S. J. Tomasello Corp., 25 Huntington Ave., $57,878. CD 7/5—ENR 7/13.

Mass., Holyoke—Commonwealth Massachusetts, Dpt. P. Wks., Boston, July 13, reconstructing, resurfacing streets, for City of Holyoke, from D. O'Connell's Sons, Inc., 491 Hampden St., $54,907. CD 7/13.

★**Michigan**—State Hy. Dpt., Lansing, July 19, non skid surface treating 14.61 mi. Mm 29-25C-2 and Mm 59-41C-1 Gratiot and Montcalm Counties, also M-32 and M-33, Montgomery Co., from Marsman & Taber, 415 Murray Bldg., Grand Rapids, $40,172 and $28,644 respectively***M-28, Alger and Schoolcraft Counties, from I. L. Whitehead, 801 Seymour St., Sault Ste. Marie, $48,774***M-25, Alger Co., from Barber Constr. Co., 6 Dearborn St., Chicago, Ill., $32,632***M-35, Dickinson and Marquette Counties, from Thornton Constr. Co., 1038 Ethel Ave., Hancock, $30,089***M-28, Ontonagon Co., from Fox Valley Constr. Co., Appleton State Bank Bldg., Appleton, Wis., $64,205***U.S. 27, M-66, M-55 and U.S. 131, Antrim, Kalkaska and Otsego Counties, also M-55, M-61 and M-66, Missaukee and Osceola Counties, from W. E. Bateson, Cadillac, $57,396 and $43,273 respectively***U.S. 23 and M-56, Monroe Co., from W. H. Knapp Co., Box 593, Monroe, $31,878***U.S. 23, M-50 and M-52, Lenawee and Monroe Counties, from Detroit Asphalt Paving Co., 702 Transportation Bldg., Detroit, $89,864***M-19, M-24, M-138 and M-161, Lapeer, Sanilac, St. Clair and Tuscola Counties, from Taylor Bros., Co., Inc., 790 Hayes St., Birmingham, $48,085***U.S. 10, M-47 and M-66, Osceola and Newaygo Counties, from Michigan Asphalt Paving Co., 231 Washington Sq. Bldg., Royal Oak, $33,180***M-50, M-106 and U.S. 127, Jackson Co., also U.S. 12, M-50, M-78, M-99 and M-188, Calhoun, Eaton and Jackson Counties, from West Shore Constr. Co., Zeeland, $25,149 and $24,956 respectively***U.S. 23, M36, U.S. 112, and M-132, Genesee, Livingston, Lenawee and Washtenaw Counties, from Lewis & Frisinger Co., 214 Madison St., Ann Arbor, $51,742***M-32, Alpena and Montmorency Counties, also M-18, M-33, M-65 and M-61, Ogemaw and Gladwin Counties, from White & Ayling, East Tawas, $49,804 and $54,711 respectively***M-43, M-66, M-16, M-96, U.S. 112, M-119 and U.S. 131, Cass, Kalamazoo, St. Joseph and Van Buren Counties, also U.S. 12, U.S. 31, M-40, M-60, M-62, M-119 and M-140, Berrien, Cass and Van Buren Counties, from John G. Yerington, Territorial Rd., R.F.D. 2, Benton Harbor, $47,178 and $36,510 respectively***M-37, M-40, M-43, M-66, M-79 and U.S. 131, Allegan, Berry and Kalamazoo Counties, from J. W. Hobeck, R.F.D. 1, Holland, $49,293.

North Carolina—State Hy. & P. Wks. Comn., Raleigh, July 20, sand clay base, surface course 3.65 mi. County Proj. 171, Carteret Co., from West Constr. Co. of North Carolina, Kinston, $36,410. Est. $35,000-$50,000.

Ohio—State Hy. Dpt., Columbus, July 11, imprv. 10.971 mi. Ross Co., from L. P. Cavett Co., 511 Shepherd Ave., Lockland, $32,414. Est. $32,860. CD 6/29—ENR 7/6.

Tenn., Knoxville—City, O. L. King, dir. Pub. Service, grading streets, installing storm and sanitary sewers in new addns. 24,829 ft. 6- to 16-in. sewer pipe, from Alley Constr. Co., Bristol, $77,300. CD 8/1—ENR 7/9.

†**Virginia**—Pub. Roads Admin., 18 and F Sts. N.W., Wash., 25, D. C., July 17, addnl. access road to Arlington Hall Station, VA-D 9 WR-38, from Corson & Gruman, 33 and K Sts. N.W., Wash., D. C., $26,769. CD 7/11—ENR 7/13.

CONTRACTS AWARDED

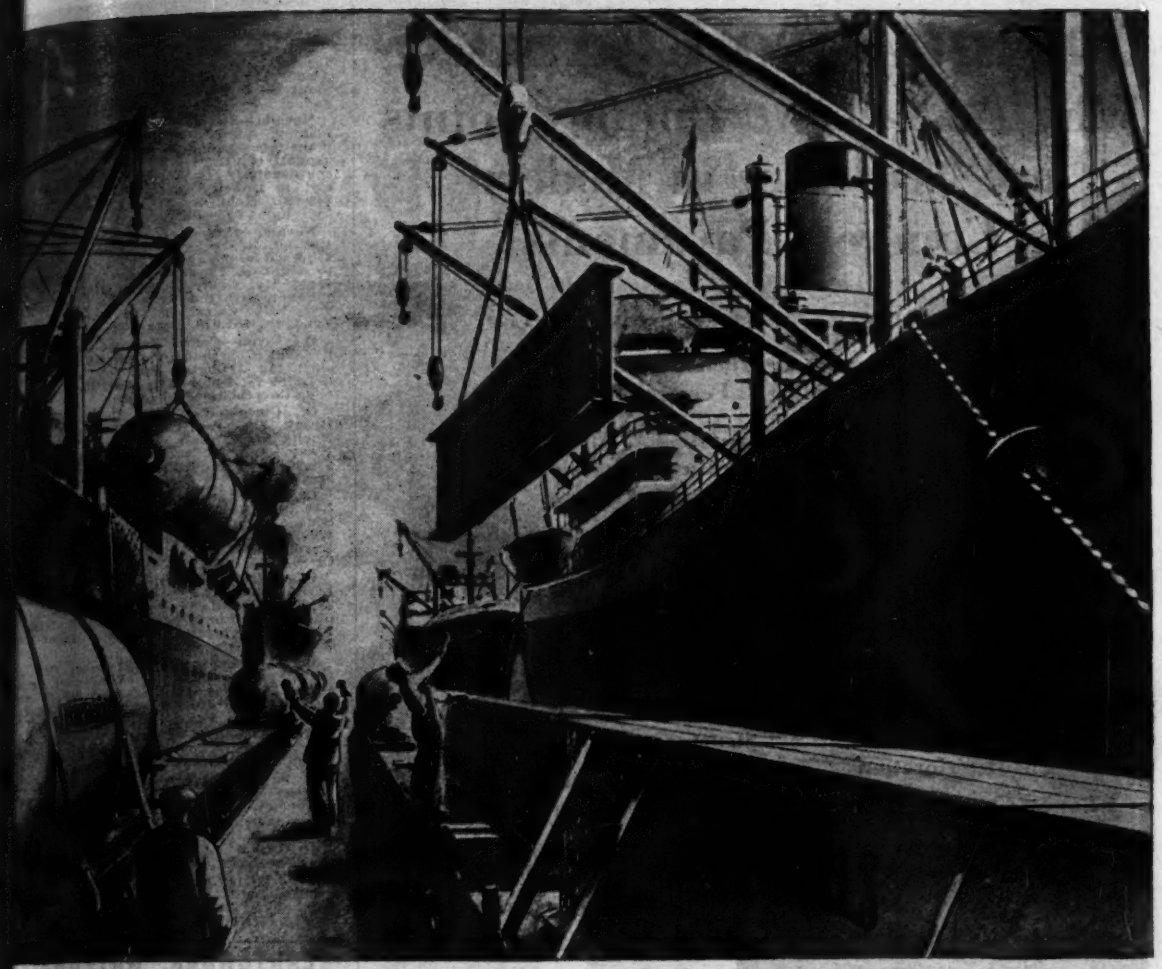
Ia., Winterset—Bd. Supervs. Madison Co., surfacing 29.8 mi. various secondary roads, to Sargent Bros., 411 E. Grand St., Des Moines, $55,473. Bids 7/6. CD 6/19—ENR 6/22.

Kentucky—State Dpt. Hys., Frankfort, imprv. 10.32 mi. Calloway Co., to R. B. Tyler, 1446 Levering St., Louisville, $44,357; 2.391 mi. Magoffin Co., to Kentucky Road Oiling Co., 3 Louisville Pike, Frankfort, $89,885. Bids 7/7. Rejected bids July 7, imprv. 1.8 mi. Daviess Co., 14.769 mi. Boyd, Fleming, Greenup and Lewis Counties. CD 6/29—ENR 6/22.

Mich., Ferndale—City, J. F. Gibbs, mgr., curbs and gutters on various streets, to L. M. Cooper, 6331 Montrose St., Detroit, $30,314. Bids 7/10.

Minnesota—State Hy. Dpt., St. Paul, imprv. 5.8 mi. S. P. 2004-04 (Trunk Hy. 65-5) S. P. 3009-11 (TH 65-189) S. P. 2313-09 (TH 65-189) and S. P. 2213-12 (TH 107-5), to Farrell Contg. Co., 1607 Wynne St., St. Paul, $79,581. Bids 6/30. CD 6/14—ENR 6/22.

Minn., Mankato—Blue Earth Co., H. E. Lee, aud., graveling, maintenance work, 25,150 cu.yd. load and crush, 246,000 cu.yd. mi. haul, to Ray Jeffries, Winnebago, $27,977. Bids 7/10. CD 6/23.



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STREETS, etc. (Contracts, Cont'd.)

★**Nebraska**—State Dpt. Rds. & Irrigation, Lincoln, imprv. 10.2 mi. road and bridge at Sta. 1106, Cheyenne Co., to Booth Alson, Inc., 622 Insurance Exch. Bldg., Sioux City, Ia., $515,844, CD 7/7—ENR 7/13 under LB.

Nevada—State Hy. Dpt., Carson City, furnishing, placing, rolling 15,135 tons P plant-mix surfacing and 422 tons 300-3 asphalt cement on U.S. Hy 395 from Re southeasterly to Washoe Summit, Washo Co., to Isabell Constr. Co., E. 4 St., Reno, $48,855. Robt. A. Allen, Carson City, sta hy. engr.

Nevada—Dpt. Hys., Carson, constructio 4.84 mi. Route 18, Sect. A from junction U. S. 40 to point northwest, Humboldt Co to Hunt & Frandsen, Reno, $82,467; Bi 6/30; Hy. Contr. 656, DA-RM69 (1) fro junction with U.S. 91 to Blue Diamond Mi and Mill, Clark Co., to Carson Frazzini Tonopah, $61,078. Bids 7/10.

O., Akron—Comrs. Summit Co., J. J. Koh ler, clk., Courthousse, asphaltic concrete re surfacing Arlington Rd., to Thorpe Constr Co., 109 N. Union Ave., $49,915, A. H. Ra ney, Courthousse, co. engr.

O., Cleveland—Comrs. Cuyahoga Co., E Husak, clk., resurfacing Chardon Rd. fro Euclid to St. Clair Aves., to W. L. Schlos Bway. and McCracken Rd., $27,981. Est $29,000. J. O. McWilliams, Standard Bldg., c engr.

Oregon—State Hy. Comn., Salem, impro 3.86 mi. Clatsop Co., to J. A. Terteling Sons, Robt. Noble Bldg., Boise, Idaho $297,717; 3.3 mi. Linn Co., to E. C. Hal Eugene, $178,019. Bids 7/12, awarded 7/1 CD 8/30.

†**Va., Norfolk**—Yards & Docks, Navy Dpt. 18 St. and Constitution Ave. N.W., Wash 25, D. C., highway grading, relocation, et Cheatham Annex, N.O.B., NOY 10142, Virginia Engineering Co., Inc., Melson Bldg Newport News, $160,000.

B. C., Sechelt—Lamb Lumber Co., Ltd 602 W. Hastings St., Vancouver, grave surfacing 4 mi. logging road, 18 ft. wide near here, to North Pass Paving Co., Ltd Rogers Bldg., Vancouver, $40,000.

Man., Winnipeg—Municipality, G. F. Beat ley, city clk., concrete paving Lilac St. an Mountain Ave., day labor, $39,781.

N. S., Halifax—Municipality, paving Bar rington St., day labor, $28,000. R. M. Mac Kinnon, City Hall, engr.

Que., Drummondville—Municipality, pav ing Heriot, Brock, St. Edourd Sts., to Mod ern Paving, Ltd., Warwick. Est. $58,00 O. Bessette, City Hall, engr.

Que., Mount Royal (Postal Dist. Montreal)—Municipality, c/o E. Ravel, clk., grading Simcoe and Lockart Sts., day labor. $23,00 W. R. McNeil, 1020 Laird Ave., engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

Que., Quebec City—City, L. Borne, mayor making plans imprv. St. Michel Brook $160,000.

BIDS ASKED

Bids Asked August 1

Maryland—State Roads Comn., Baltimore widening, deepening channel at Matapeake Terminal of Chesapeake Bay Ferry, approx 37,000 cu. yd. scow measurement, Contr Q-170-1-278, Queen Anne Co. Plans deposit $5.

Indiana—State Hy. Comn., S. C. Haddon ch., Indianapolis, channel clearing of brush shrubs, trees at existing 60 ft. span steel truss bridge over Slough Ditch 4.2 mi. west of Washington; at existing 3 span, 594 ft. steel truss bridge over Overflow of west fork of White River, 3.8 mi. west of Washington, Contr. 2524, Knox Co.; Plans deposit $1.75; at existing 3 span, 594 ft. steel truss bridge over west fork of White River, 3 mi. west of Washington, Contr. 2524, Davies Co.; at existing 3 span, 594 ft. steel truss bridge over west fork of White River, 1.6 mi. west of Elnora, Contr. 2525, Knox Co., both plans deposit $1.25. R. Bower, ch. engr.

Bids Asked August 3

California—At office G. T. McCoy, engr., State Hy. Dpt., Los Angeles, repairing concrete lined tunnel with Class E concrete on Ridge Route about 1 mi. northerly of Frenchman's Flat, Los Angeles Co.

S. C., Charleston—U. S. Eng., 33 Customhouse, dredging 35 ft. Charleston Harbor, Cooper River and Town Creek Channels.

Bids Asked August 8

†**Neb., Hay Springs** — Farm Security Admin., 950 Bway., Denver, Colo., land clearing and levelling, erosion and weed control, farm supply laterals, farm irrigation and drainage structures, ditches, bridges, piling at Mirage Flats Project, $275,000.

Bids Asked August 9

Calif., Dyerville—At office E. Hyatt, state engr., P. Wks. Bldg., Sacramento, bank protection on Eel River at Founders Grove, for Dpt. P. Wks., Div. Water Resources.

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EARTHWORK WATERWAYS (Bids Asked, Cont'd.)

Bids Asked August 17

†**Oklahoma**—Bureau Reclamation, Denver, Colo., furnishing, del. f.o.b. cars shipping point or Altus, one multiple type gate frame for 7.8x7.8 ft. fixed wheel gate for 3 canal outlets at Altus Dam, Altus Project, Spec. 1754-D.

Bids Asked August 18

†**Oklahoma**—Bureau Reclamation, Denver, Colo., furnishing, del. f.o.b. cars shipping point or Altus, one 7.8x7.8 ft. fixed-wheel gate for installation in canal outlet structure at Altus Dam, Altus Project, Spec. 1755-D.

LOW BIDDERS

†**La., Harvey**—U. S. Eng., foot of Prytania St., New Orleans, July 17. Harvey Lock entrance improvs., Sol. 16-047-44-135, from J. Ray McDermott & Co., Harvey, $40,878. CD 7/3—ENR 7/13.

CONTRACTS AWARDED

★†**Louisiana**—U. S. Eng., P. O. Box 60, Vicksburg, Miss., approx. 529,000 and 527 cu. yd. earthwork on right bank Mississippi River, Solic. Nos. 22-052-44-133, Item 584 R. Milliken Bend Enlargement and Item 587 R. Cabin Teal Enlargement, to Jones-Gillis Contr. Co., McComb, Miss., approx. $300,000*** approx. 573,000 and 465,000 cu. yd. earthwork on right bank Mississippi River, Solic. No. 22-052-44-133, Item 593 R. Duckport Enlargement and Item 596 R. Young's Point enlargement, to W. C. Shepherd, 2450 Briarcliffe Rd. N.E., Atlanta, Ga., approx. $313,000*** approx. 520,000, 449,000 and 433,000 cu. yd. earthwork respectively on right bank Mississippi River, Solic. No. 22-052-44-133, Item 5999 R. Delta Point Enlargement, 605 R. Below Delta Point Enlargement, and 606 R. Reid Bedford Enlargement, to Chas. W. Greerson & Son Cont. Co., Baton Rouge, $423,500, all foregoing in Madison Parish. Grand total $1,036,500. Bids 7/5. CD 6/16—ENR 6/22.

B. C., Powell River—Powell River Co., Ltd., 1204 Standard Bank Bldg., Vancouver, dredging, fill, e'c., for new log selection process, to Northern Constr. Co. & J. W. Stewart, Ltd., 736 Granville St., Vancouver, about $100,000. Harold Moorhead, Powell River, engr. Awarded 6/30.

LATIN AMERICA

Mexico—National Railways of Mexico, 19 Bolivar St., Mexico City, bids within 3 months reconstructing Torreon, Chihuahua railroad, in states of Coahuila-Chihuahua. $500,000.

Mexico, Chihuahua—National Railways of Mexico, L. Reina, ch. engr., M.W. 19 Bolivar St., Mexico City, plans passenger and freight station, $150,000.

Mexico, Ciudad Juarez—Municipal Govt., Palacio Municipal, Cuidad Juarez, plans street paving, reconditioning bldg. and primary and secondary school. $410,000.

Mexico, Cuernavaca—Mrs. Elizabeth Jenkins Higgins, Cuernavaco, plans movie theater in fall, $200,000.

Mexico, Jilotepec—State of Mexico, Capitol City, Toluca, will construct and repair Las Penas Hy., by own forces. $100,000.

Mexico, La Primavera—National Sugar Products, Union Bank of Mexico Bldg., Mexico, D.F., plans 2,000 ton daily capacity sugar central. $2,000,000.

Mexico, Monterrey—State of Nuevo Leon, E. Ortiz, zone comdr., Monterrey, will construct military barracks, by own forces. $200,000.

Mexico, Shimojay—City, bids within 50 days school in Shimojay Dist. $150,000.

Mexico, Yecuatla—City, Sr. Alberto Cabrera Cartas, municipal pres., plans school. $210,000.

PUBLIC BUILDINGS

PROPOSED WORK

Ark., Benton—State Bd. Control, c/o Dr. Fletcher, Hot Springs, rejected bids July 14, bldg. at Benton Colony of State Hospital. $200,000. Bruggeman, Swaim & Allen, Gazette Bldg., Little Rock, archts. CD 6/28—ENR 7/6.

†**Calif., Bakersfield**—U. S. Dpt. Agriculture, Emergency Rubber Project, 315 W. 9 St., Los Angeles, wood frame guayule rubber plant, extraction plant, laboratory, warehouse, office and boiler room $350,000. Southwestern Eng. Co., 4500 S. Santa Fe Ave., Vernon, engrs.

†**Calif., Darwin**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, 20 family stop-gap dwelling units, Calif. 4872.

†**Calif., San Francisco**—Home Owners' Loan Corp., 821 Market St., plans by M. A. Sheldon, Monadnock Bldg., converting bldg. 3851 21 St., providing 3 living units for immigrant war workers, Case No. W4A-1578. Over $5,000.

†**Calif., San Francisco—North Bay**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, 500 family stop-gap family dwelling units, Calif. 4874.

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

†**Calif., San Pablo**—Federal Works Agency, 15 Shattuck Sq., Berkeley, Zone 4, working drawings, by Dragen & Schmidts, 2068 Allston Way, Berkeley, frame, stucco fire house. $11,000.

†**Calif., Vallejo**—Federal Works Agency, 15 Shattuck Sq., Berkeley, Zone 4, working drawings by H. J. Devine, Crocker Bldg., Sacramento, frame fire house, Calif. 4-617. $14,000.

†**Calif., Vallejo**—Federal Works Agency, 15 Shattuck Sq., Berkeley, working drawings by D. H. Horn, Claremont Hotel, Berkeley, 4 frame nursery bldgs., Calif. 4-632. $95,275.

†**Conn., Groton**—Federal Works Agency, 90 Chauncy St., Boston, Mass., plans by L. F. Caproni, 1221 Chapel St., New Haven, 4 room, cinder block temporary school, Conn. 6-229-F. $30,000. CD 5/29—ENR 6/1.

†**Conn., New London**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave., N.W., Wash., 25, D. C., making plans 1 story, 16x35 ft. frame storage unit housing underground sound equip. $6,000.

†**Conn., Willimantic**—Pub. Housing Auth., NHA, 34 School St., Boston, Mass., making plans grading, drainage, etc., for war housing, Conn. 5181.

†**Ga., Hogansville**—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Zone 3, 30 family stop-gap dwelling units, Ga. 9174.

†**Ill., Springfield-Decatur**—Pub. Housing Auth., NHA, 201 North Wells St., Chicago, 6, 60 family dwelling units, Ill. 11219.

★†**Kan., Topeka**—Goodyear Tire & Rubber Co. of Kansas, Inc., Topeka, synthetic rubber mfg. plant. $6,500,000. Defense Plant Corp. will finance.

†**La., Weeks Island**—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, 2, Tex., 26 family dwelling units, La. 16107.

†**Md., Elkton**—Union Hospital, Elkton, plans by Buckler & Fenhagen, 325 N. Charles St., Baltimore, service wing addn. to present bldg., Md. 18-105. FWA.

†**Md., High Point**—Bd. Educ., Anne Arundel Co., Annapolis, plans by Buckler & Fenhagen, 325 N. Charles St., Baltimore, 1 story, 60x186 ft. school bldg., Md. 18-210. $75,000. FWA.

†**Me., South Portland**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., making plans store unit addn. bldg., for housing, Me. 17038.

†**Mich., Detroit** — Pub. Housing Auth., NHA, 2073 E. Ninth St., Cleveland, 15, O., 1,000 family dwelling units, Mich. 20237.

†**Mich., Muskegon** — Pub. Housing Auth., NHA, 2073 E. Ninth St., Cleveland, 15, O., 60 family dwelling units, Mich. 20236.

Miss., Parchman—State Penitentiary, c/o Marvin Wiggins, supt., Jackson, rebuilding cotton gin and warehouses. $175,000 funds appropriated.

†**Neb., McCook**—Pub. Housing Auth., NHA, 201 North Wells St., Chicago, 6, Ill., 100 family dwelling units, Neb. 25081.

†**Neb., Sidney**—Pub. Housing Auth., NHA, Dierks Bldg., 1006 Grand Ave., Kansas City, Mo., plans by Fisher & Fisher, Denver National Bank Bldg., Denver, Colo., administration and community bldgs., for housing.

†**Nev., Fallon**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., plans by De Longchamps & O'Brien, Gazette Bldg., Reno, 30 unit temporary family housing, Nev. 26165.

†**N. D., Minot** — St. Joseph's Hospital, Minot, plans by W. F. Kurke, 117 13 Ave. N., nurses home, N. D. 23-104-N. $160,000. FWA. CD 5/22—ENR 5/25.

Pa., Lancaster—Lancaster General Hospital, 341 N. Westend Ave., plans by J. R. Edmunds, Jr., 409 Calvert Bldg., Baltimore, Md., hospital bldg. addn. and nurses home.

†**S. C., Winnsboro**—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, 3, Ga., 50 family stop-gap dwelling units, S.C. 23062.

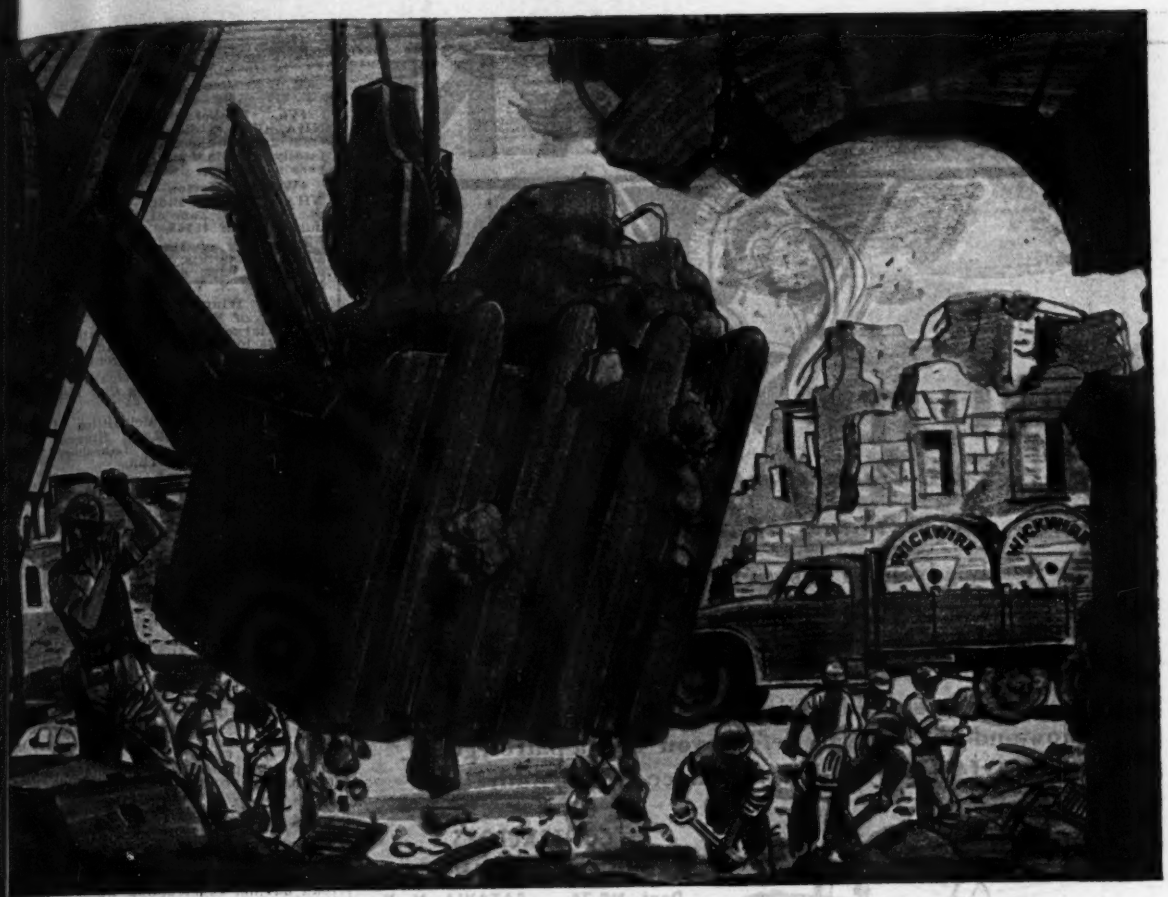
†**Tex., Beaumont, Orange and Port Arthur**—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, Zone 2, 100 family stop-gap dwelling units, Tex. 41659.

†**Tex., Brady**—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, Zone 2, 30 family stop-gap dwelling units, Tex. 41658.

†**Tex., Corpus Christi**—Bd. Educ., Corpus Christi, plans by N. W. Hardy, 59 Country Club Pl. and Brock & Anderson, Jones Bldg., Corpus Christi, school bldg. $118,000-$150,000. FWA. CD 5/13—ENR 5/25.

†**Tex., Port Neches**—Pub. Housing Auth., NHA, 2105 Electric Bldg., Seventh and Taylor Sts., Fort Worth, rejected bids July 7, road construction, repairs, Tex. 41-550 Consolidated Architects & Engineers, Capps Bldg., Fort Worth, archts.

†**Utah, Consumers**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., 12 family stop-gap dwelling units, Utah 42190.



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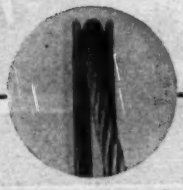

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PUBLIC BLDGS. (Proposed Work, Cont'd.

†**Utah, Salt Lake City**—Salt Lake Co. C and County Bldg., plans by C. W. Sc 617 Dooly Bldg., 3 story nurses home ad Salt Lake General Hospital, $45,000. FW CD 6/7—ENR 6/15.

†**Va., Timberville**—Pub. Housing Aut NHA, Georgia Savings Bank Bldg., Pac tree and Broad Sts., Atlanta, 3, Ga., family dwelling units, Va. 44317; 100 stor person stop-gap dwelling units, Va. 44318

†**Wash., Morton**—Pub. Housing Aut NHA, Skinner Bldg., Fifth Ave., Uni St., Seattle, Zone 1, 15 family dwell units, Wash. 45268.

†**Territory of Hawaii**—U. S. Eng., Fir and Douglas Sts. N.W., Wash. 25, D. C. plans by York & Sawyer, 101 Park Ave New York, N. Y., hospital bldg.

Man., Winnipeg—Dominion Govt., c Ministry of Finance, Ottawa, Ont., conver ing 18 large houses into small units, $150, 000. National Housing Admin., c/o Dp Finance, Ottawa, Ont., archts.

N. S., Halifax—Municipality, C. Publ over, city clk., enlarging City Home heatin plant. $52,000.

Ont., Mimico—Municipalities of Mimic New Toronto and Long Branch, hospital $200,000. David Post, Lakeshore Progres Club, New Toronto, chn.

Que., Granby—Bd. School Comrs., 9 Eugene Parish Hall, Granby, schoo $175,000.

Que., New Richmond—Municipality, 1 bed hospital. $200,000.

Que., Ormstown—Barrie Memorial Hosp tal Bd., Ormstown, plans by E. J. Turcotte 1010 W. Ste. Catherine St., Montreal, hos pital addn. Over $200,000.

★**Que., Sherbrooke**—Bd. Governors Sher brooke General Hospital, Col. A. A Munster, pres., Park St., hospital, 150 bed North Ward of city. $850,000. CD 5/25— ENR 6/8.

Que., Sweetsburg—Province of Quebec c/o Dpt. Provincial Secretary, Quebec City impry., exten. Industrial School. $150,000. Dpt. P. Wks., Quebec City, archts.

†**T. H., Oahu**—Yards & Docks, Navy Dpt. 18 St. and Constitution Ave. N.W., Wash. 25, D. C., plans by Jaros, Baum & Bolles engrs. and archts., 415 Lexington Ave., New York, N. Y., 6 engine test cells.

BIDS ASKED

Bids Asked July 31

†**Conn., Plainville**—Pub. Housing Auth. NHA, 24 School St., Boston, Mass., grading, road paving, constructing water utility, war housing, Conn. 6035. Plans deposit $50 for first set and $10 for ea. addnl. set. CD 7/14—ENR 7/20.

Bids Asked in August

†**N. J., Somerville**—Somerset Hospital, Rehill Ave., 3rd story, brick hospital addn., alterations, N.J. 23-117-N. $300,000. FWA. Extended date. Crow, Lewis & Wick, 200 5 Ave., New York, N. Y., archts. CD 6/22— ENR 6/29.

Bids Asked August 1

Mich., Carney—Fred Vescolani, supt. Nadeau Twp. Schools, Carney, school. Warren B. Holmes Co., 2200 Olds Tower Bldg., Lansing, archt.

†**Mich., Inkster**—Pub. Bldgs. Admin., 18 and F Sts. N.W. Wash., 25, D. C., 1 story, 12 classroom school bldg., Mich. 23-141. Jensen & Keough, 15875 Jas. Couzens Hy., Detroit, archts. CD 7/12—ENR 7/20.

Bids Asked August 2

†**Conn., Waterbury**—Pub. Housing Auth., NHA, 24 School St., Boston, 8, Mass., bldg., maintenance and management bldg., Conn. 6206. Plans deposit $50 first set, and $10 each addnl. set. E. J. Richmond, 174 Grand St., archt. CD 7/21—ENR 11/11.

Bids Asked About August 7

†**Pa., Chester**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash., 25, D. C., 1 story recreation bldg., Pa. 36-199. $300,000. H. R. Robinson, 1927 11 St. N.W., Wash., D. C., archt. CD 7/18—ENR 7/20.

Bids Asked August 9

†**Ga., Port Wentworth** — Pub. Bldgs. Admin., 18th and F Sts. N.W., Zone 1, Wash., D. C., 1 story, 14 classroom school, Ga. 9-273(F). CD 6/6—ENR 6/8.

†**Md., Baltimore**—Johns Hopkins Hospital, Bway. and Monument Sts., at office, Jas R. Edmunds, Jr., archt., 409 Calvert Bldg., 2 story Harriet Lane Bldg. addn., alterations, $78,100. FWA.

†**Ga., Savannah**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Zone 3, Wash., D. C., 1 story 16 classroom school. Ga. 9-273(F). CD 6/6—ENR 6/8.

Bids Asked August 10

B. C., Vancouver—J. M. Somerville, secy. Dpt. P. Wks., Ottawa, Ont., 4 story hospital wing and additional story to admin. bldg., both rein.-con., for Dpt. Pensions & National Health. Ottawa, Ont. $455,000. Plans deposit $75. Mercer & Mercer, 615 W. Hastings St., archts. CD 4/4—ENR 4/6.

BLIC BLDGS. (Bids Asked, Cont'd.)

Bids Asked August 23

...Navy Yard—Veterans Admin., ... Vermont Ave. between H and I Sts., ... D. C., Acute Bldgs. 24-H and ... and laundry bldg. $500,000. CD 7/10 ENR 7/13.

...W BIDDERS

...Ark., Pine Bluff—Watson Chapel School ... F. Moore, school superv., Pine Bluff, ... high school, Ark. 3-139-N, from ... 12, Construction Co., Texarkana, $194,500. Est. ...Constr. Co., Texarkana, $194,500. Est. $3,000. FWA. CD 6/29—ENR 7/6.

...Mass., Groton—Pub. Housing Auth., NHA, ... School St., Boston, Mass., July 18, grad- ... drainage, site improvs., war housing, ... 6918, from Frank J. Shields, Inc., 51 ...ital St., Southbridge, Mass., Proposals $65,000, (2) 59c. per cu. yd. CD 7/6.

...Ill., Chicago—Pub. Housing Auth., NHA, ... S. LaSalle St., July 18, 250 unit 2 ... duplex residences, Ill. 11-208, from ...Constr. Co., 2353 W. Grand Ave., ...94,945. CD 6/22—ENR 6/29.

...Ill., Decatur-Springfield—Pub. Housing ...h., NHA, 201 N. Wells St., Chicago, July ... 150 unit one story, housing Ill. 11-215, ...m Bedford & Hill, East Hartford, Conn., ...,300. CD 7/17.

...Md., Aberdeen Proving Ground—U. S. ..., Standard Oil Bldg., Baltimore, instru- ...t bldg. and firing stockade, from D. ...acci & Co., 2553 Woodbrook Ave., Balti- ..., $63,943. CD 7/12—ENR 7/20.

...Md., Baltimore—Yards & Docks, Navy ... Dpt., 18 St. and Constitution Ave., Wash. ... D. C., expanding Naval Magazine, at ...rkins Point, NOY 9155, from Charles H. ...mpkins Co., 907 16 St. N.W., Wash., ...C, $536,900. CD 7/12.

...Md., Greenbelt—Federal Works Agency, ... and F Sts. N.W., Wash., 25, D. C., July ... school, Md. 18-203-F3-1, and high school ...s. Md. 18-303-F3-2, from E. L. Daniels ... Arlington, Va., $243,572. CD 6/23—...R 6/29.

...N. Y., Deer Park—U. S. Eng., 120 Wall ... New York, Zone 5, July 18, repairing, ...ering Edgewood State Hospital, from ...liaks Constr. Co., 384 E. 149 St., New ...rk, Zone 55, Proposal A, Items 1-17, ...66,877; from James J. Waters Corp., 415 ...xington Ave., New York, Zone 17, Proposal ... Items 1-19, $472,979. CD 7/12.

...Wis., Merrimac—U. S. Eng., 408 Federal ...dg., Milwaukee, July 13, plumbing and ...ating work from Downey Heating Co., ...13 W. St. Paul Ave., and John F. Ahern ..., Fond du Lac, $293,004; July 14, water ...str. sys., from Calumet Engrg. Co., Ham- ...ond, Ind., $157,000, both at Badger Ord- ...nce Plant. Hercules Powder Co., 908 ...arket St., Wilmington, Del., will operate. ...ason & Hanger Co., 500 Fifth Ave., New ...rk, N. Y., engr.-archt.

...(Wyo., Sheridan—Veterans Admin., Ver- ...mont Ave. between H and I Sts. N.W., ...sh. 25, D. C., July 18, addnl. hospital ...dgs. from Francis R. Orahek Co., Freemont, ...b., $378,000. CD 6/5—ENR 6/8.

...NTRACTS AWARDED

...Ill., Joliet—Yards & Docks, Navy Dpt., 18 ... and Constitution Ave. N.W., Wash. 25, ... C., fire protection, spare parts warehouse, ...OY 10191, to Michael J. MacDermott & ..., 30 N. LaSalle St., Chicago. CD 6/26—...NR 6/29.

...Md., Solomons—Yards & Docks, Navy ...pt., 18 St. and Constitution Ave. N.W., ...ash., 25, D. C., Brig and Mask I train- ...g bldg., at Amphibious Training Base, ...OY 9237, to Consolidated Eng. Co., Inc., ... Paul and Franklin Sts., Baltimore, ...,000.

...Mass., Chelsea (Br. Boston)—Yards & ... Docks, Navy Dpt., 18 St. and Constitution ...ve. N.W., Wash. 25, D. C.; Waves barracks ...d dependents hospital unit, Naval Hospital, ...OY 9462, to C. J. Maney Co., Inc., 24 Dane ...t., Somerville, $665,000. CD. 7/11.

...Mass., Springfield — Monsanto Chemical ..., 515 Monsanto Ave., 2 story, 60x80 ft., ...ca-con. factory, to J. G. Roy & Sons Co., ...Silver St. Est. $45,000. Bids 7/14. De- ...ense Plant Corp. will finance. CD 7/10.

...N. J., Metuchen—U. S. Eng., 120 Wall ..., New York, 5, N. Y., 1 story, 67 x 133 ... brick quartermaster warehouse bldg., ...t Raritan Arsenal, to Fred J. Brotherton, ..., 185 Atlantic St., Hackensack, $45,887. ...ids 7/13. CD 7/3—ENR 7/6.

...O., Youngstown—St. Elizabeth Hospital, ...ster M. Germaine, supt., 1044 Belmont St., ...neral contract, 2 story, basmt., 102x332 ft. ...rses' training school, auditorium, brick, ...bio 33-243, to Davis-Smith Co., 516 Federal ..., Pittsburgh, Pa., $187,700. FWA. M. E. ...rber, Hanna Bldg., Cleveland, engr. CD ...6.

...Pa., Mechanicsburg — Yards & Docks, ... Navy Dpt., 18 St. and Constitution Ave. ...W., Wash., 25, D. C., storehouses, roads, ..., Naval Supply Depot, NOY 9434, to James ...ewart & Co., Inc., 230 Park Ave., New ...rk, N. Y., $3,379,000. CD 7/20, under LB.

...Tenn., Nashville—Polar Cold Storage, ... Inc., Nashville, 1 story, 200x250 ft., ...ick, concrete quick freeze plant, to V. L. ...Nicholson Co., Nashville Trust Bldg. Est. ...,000,000. Defense Plant Corp., will finance. ... Warfield & Associates, Nashville Trust ...dg., archts. CD 6/6—ENR 6/8.

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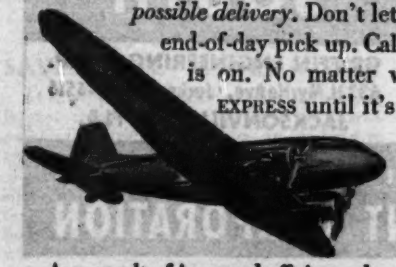

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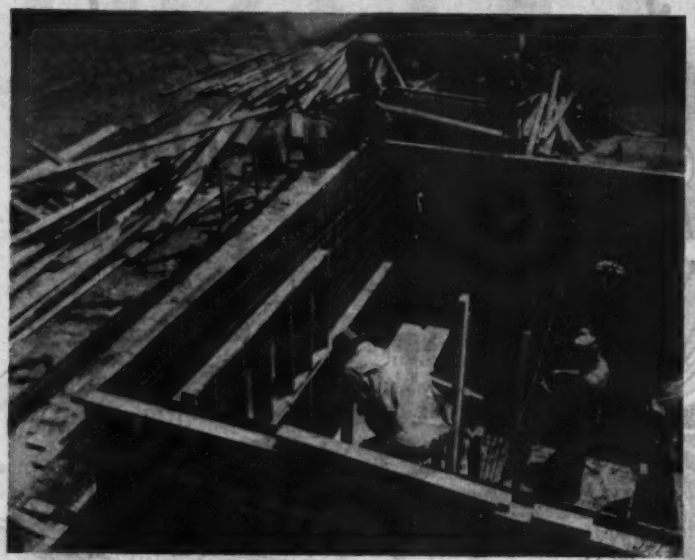

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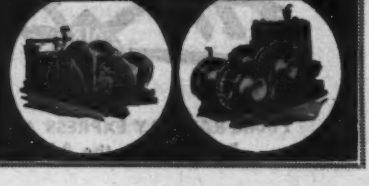


PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†**Tex., Houston**—Sheffield Steel Co., Industrial Rd., slag crushing plant, stee, reinforcing con., to W. S. Bellows Constr. Co., Box 2123, $100,000. Defense Plant Corp. will finance. CD 7/13—ENR 7/20.

★†**Wash., Bangor**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., structures, railroads, sidings, Naval Stowage and Transshipment Station, NOY 9459, to Sound Constr. & Eng. Co. and Peter Kiewit Sons' Co., 1403 W. 45 St., Seattle, 7, $2,434,347. CD 7/18.

Que., Gaspe—Dpt. P. Wks., Quebec City, court house and jail, to Laurent Giroux, St. Casimir, approx. $150,000. CD 7/11—ENR 7/13.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Redondo Beach—Frederick Fisher Constr. Co., 6367 Yucca St., Hollywood, 12, frame, stucco dwellings. $400,000.

★**Calif., Santa Monica**—Santa Monica Hospital, c/o A. R. Walker, archt., 315 Security Title Bldg., Los Angeles, 4 story, bsmnt., 48x140 ft. rein.-con., brick hospital bldg. with 26x39 ft. wing. $570,000. Applied to FWA.

Conn., Stratford—Tano Enterprises, Inc., Thos. B. Frouge, pres., 74 Goodsell St., Bridgeport, brick, steel theatre, Boston and Bruce Aves. $200,000.

Ga., Atlanta—Montclair Apartments, Inc., c/o A. Thos. Bradford, archt., Wm. Oliver Bldg., making plans 9 apartment bldgs. (50 units), Clairmont and North Decatur Rds.

Ga., Barnesville—M. Binford, Thomaston, 50 houses. FHA.

Ill., Chicago—Owner, c/o Luther & Christensen, archts., 9453 S. Ashland Ave., plans nearing completion two hundred 2 story, 22x24 ft., brick residences, 101, 103, Maplewood and Washtenaw Sts.

N. C., Wilmington—James Walker Memorial Hospital, Rankin St., plans by L. Boney, Murchison Bldg., Wilmington, service bldg. at hospital, $89,000. Seeking FWA funds.

Pa., Erie—Isaac Baker & Sons, Edward Baker, mgr., c/o associate architect, plans by Walter T. Monahan, 406 Marine Merchants Bank Bldg., and Geo. B. Meyer, assoc. archt., 1030 Schofield Bldg., Cleveland, O., rebuilding 2 story, bsmnt., 50x190 ft., brick store bldg., 7 and State Sts. $150,000. CD 1/18—ENR 1/20.

★**Tex., Houston**—Hermann Hospital Estate, Stewart Bldg., 400 bed hospital unit, $3,000,000.

N. S., Halifax — Nova Scotia Mainland Branch of the Navy League c/o R. A. Magor, pres., Barr St., 1 story, bsmnt., 120x160 ft. auditorium with 30x40 ft. stage, courts, dance hall and 7 bowling alleys, Sackville St. $150,000.

Ont., Toronto—F. Baldwin, 53 Glenwood Crescent, dwellings. $150,000.

Ont., Toronto—J. Bernstein, 686 Durie St., dwellings. $150,000.

Ont., Toronto—Salter Constr. Co., Ltd., 783 Spadina Rd., dwellings. $150,000.

Que., Montreal—Dr. Beinhaker, 5430 Park Ave., flat dwellings, Peel St. $150,000.

CONTRACTS AWARDED

Ga., Marietta—Martin Theatres, 1305 Bway., 160x200x225 ft. theatre and 4 store bldgs. near Bell Bomber plant, Cobb County, to J. N. Bray Constr. Co., Valdosta, approx. $200,000. E. Oren Smith, Columbus, archt.

★**Ill., Chicago**—Princeton Park Trust, c/o Donald O'Toole, 461 E. 111 St., 678 units, 2 story, brick, group housing, 91, 95 and Wentworth Sts., separate contracts. $1,600,000. Holsman & Holsman & Klekamp, 140 S. Dearborn St., archts. CD 5/24—ENR 6/1.

Mo., Kansas City—General Building Co., c/o Robt. Johns, 309 N. 27 St., Kansas City, Kan., 88 frame residences, to Bethany Rock Co., 3600 Wayne St. Est. $265,000. W. B. Rollins & Co., Railway Exch. Bldg., consult. engrs.

N. D., Grand Forks—K. V. Bacon, Grand Forks, rebuilding Dakota Hotel, to A. T. Skarsbo, 1302 Belmont St., aprox. $250,000. T. B. Wells, 425 Kittson Ave., archt. R. L. Bloom, Sexton Bldg., Minneapolis, Minn., engr. CD 6/28—ENR 7/6.

Pa., Harrisburg—Penn Roosevelt Co., 45 W. 45 St., New York, N. Y., sixty-six 2 story, brick dwellings on Waldo, N. 7, and Radnor Sts., to White-Hall Constr. Co., 45 W. 45 St., New York, N. Y., $224,400. W. H. Levinne, Perth Amboy, N. J., archt.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Alta Loma — PLANT — Alta Loma Heights Lemon Assn., Alta Loma, soon lets contract, 1 story, 101x150 ft., lemon packing plant addn., rein.-con. Over $40,000. W. W. Ache, 301 N. Citrus Ave., Los Angeles, archt.

INDUSTRIAL BLDGS. (Proposed Work, Cont'd.)

Colo., Denver—WAREHOUSE, etc.—Goldstein Bros., 3500 Walnut St., sketches by owner H. Simon, 2988 Dahlia St., reconstructing 4 story warehouse and office bldg. over $100,000.

Colo., Pueblo—PLANT—Denver & Rio Grande R.R. Co., soon lets contract, A. E. Grisman, ch. engr., Rio Grande Bldg., Denver, plant to reclaim oil and waste. $61,604.

Conn., Bridgeport—FACTORY—Metropolitan Body Co., 751 Kossuth St., soon lets contract 1 story, 55x150 ft., cinder block basement 1 story, $40,000. Fletcher Thompson, Inc., 211 State St., engrs.

Conn., Fairfield—FACTORY—Bridgeport Molded Products Co., 195 Meadow St., plans completed 1 story, brick factory addn., Meadow St. $45,000.

Ga., Griffin—BOTTLE PLANT—Knox Glass Bottle Co., Jackson, Miss., plans by H. L. Robinson, c/o owner, 100x800 ft. glass bottle plant.

Mich., Detroit—PLANT—McIntosh Stamping Co., 13881 Elmira Ave., plans by Jensen & Keough, 15875 Jas Cousens Hy., brick, steel, rein.-con. plant addn. $45,000.

Mich., Detroit—PLANT—Sterling Stamping Co., c/o Jos. P. Jogerst, archt., 53 Marston Ave., making plans first unit brick, concrete, steel, stamping plant. $50,000.

Mich., Detroit Lakes—PLANT—Group of creameries in several counties, Wm. Thompson, secy., Frazee, milk dehydrating plant, rein.-con., brick $166,000, incl. equip.

N. J., Arlington—STORAGE—E. I. Du-Pont de Nemours Co., 1007 Market St., Wilmington, Del., soon lets contract, 1 and part story, nylon storage bldg., frame, concrete block.

N. J., Mountain Lakes—PLANT—Standard Railway Co., Fanny Rd., 50x80 ft., 50x90 ft. and two 25x35 ft., brick, concrete mfg. plant bldgs. Over $50,000.

N. J., Piscataway (P. O. Bound Brook)—BOILER HOUSE, etc.—Benzol Products Corp., Meadow Rd., plans by Ferdinand Koenig, 48 Walnut St., Newark, 1 story, brick, steel boiler house, and coal silo for factory bldg. $100,000.

O., Cleveland—FACTORY—White Motor Co., A. Black, in charge, 842 E. 79 St., plans by A. E. Rowe, engr. and archt., 1900 Canfield Ave., monitor type roof and altering factory Bldg. 4, $110,000; laboratory bldg. alterations, $40,000.

O., Cleveland—FOUNDRY—Glunts Brass & Aluminum Foundry Co., D. J. Glunts, pres., 16002 Harvard Ave., 1 story, 35x175 ft., brick, steel foundry, $40,000.

O., Cleveland—SERVICE, etc.—Pennsylvania R. R., J. L. Gressitt, ch. engr., Broad St. Station Bldg., Phila., Pa., 1 story, 60x115 ft., tile, steel service bldg. and 5 stall engine house with drop table. $283,618.

O., Franklin—BOILER HOUSE—Franklin Board & Paper Co., Franklin, altering boiler house. $44,000.

O., Harvey—COAL AND WATER STATION, etc.—Pennsylvania R. R., J. L. Gressitt, ch. engr., Broad St. Station, Phila., Pa., coal and water station and second track. $133,716.

O., Ironton—FACTORY—Henrito Products Corp., Ironton, brick, steel factory addn. $53,880.

O., Tiffin—COALING STATION—Pennsylvania R. R., J. L. Gressitt, ch. engr., Broad St. Station Bldg., Phila., Pa., coaling station. $193,716.

O., Toledo — FACTORY — Owens-Corning Fiberglas Corp., Nicholas Sq., altering factory, new sub-station. $193,817.

Pa., Jeannette — PLANT — Pennsylvania Rubber Co., P. C. Mathewson, mgr., sketches altering 2 story, bsmnt., brick synthetic rubber mfg. bldg.

Tenn., Memphis—WAREHOUSE—Louisville & Nashville R. R., C. H. Blackman, ch. engr., 886 W. Bway., Louisville, Ky., rebuilding warehouse. $200,000.

Tenn., Memphis—WAREHOUSE—Tennessee Cold Storage & Warehouse Co., T. J. Hammond, pres., P. O. Box 1320, cold storage warehouse. $40,000.

B. C., Vancouver—PLANT—Findlay Simpson Shingle Co., Ltd., 408 Standard Bank Bldg., shingle, lath, sash and door plant.

B. C., Vancouver—PLANT—Fish Dehydrators, Ltd., 1025 Main St., food processing plant, etc. $50,000.

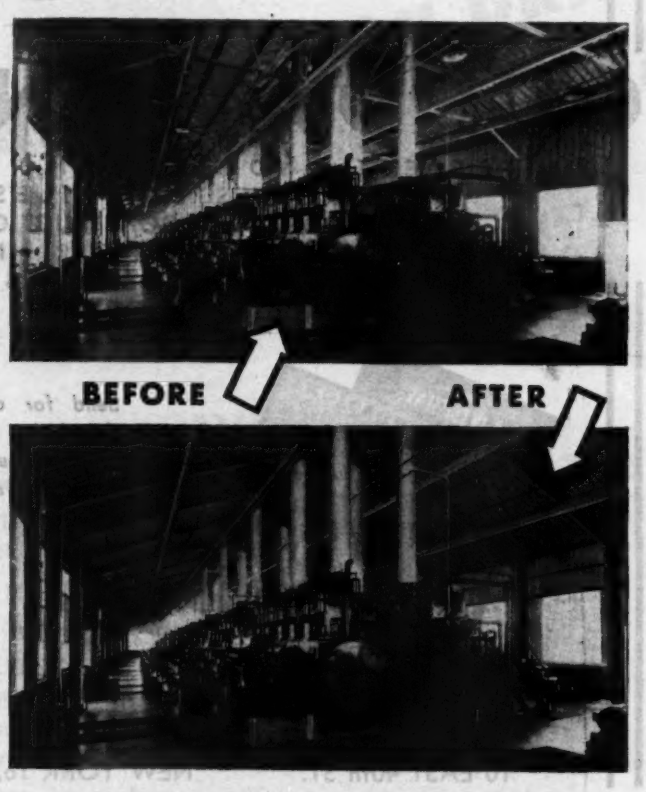
B. C., Victoria—PLANT—Falconer Marine Industries Ltd., 130 Kingston St., plant addn. $40,000.

N. B., Atholville—PLANT—Restigouche Co., Ltd., Edmundston, altering plant. $41,-000.

Ont., Alfred—WORKSHOPS—Bd. St. Joseph Industrial School, c/o Rev. Bro. Jerome, Alfred, workshops. $55,000.

Ont., Belleville—PLANT—Canada Cement Co., Ltd., Canada Cement Bldg., Montreal, preparing plans altering plant. $43,000.

Ont., Blind River—SERVICE STATION—Canadian Oil Co., Ltd., 207 Queen Quay, Toronto, service station, etc. $50,000.



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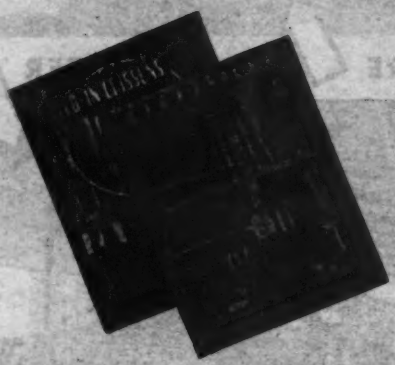

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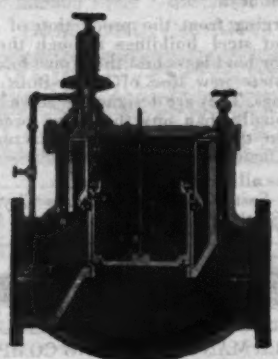

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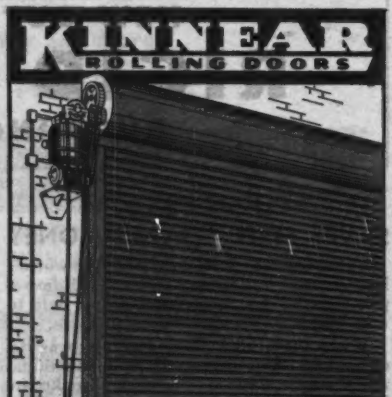

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INDUSTRIAL BLDGS. (Proposed Work Cont'd.)

Ont., Chatham—PLANT—Ontario Steel Products Ltd., Gananogue, plant. $40,000.

Ont., Fort Erie—RAILWAY STATION—New York Central System, S. E. Armstrong, engr. M.W., 466 Lexington Ave., New York 17, N. Y., modern new station.

Ont., Fort William—PLANT—Great Lakes Lumber & Shipping Ltd., Fort William, altering plant. $65,170.

Ont., Harrow—PLANT—W. Clark, Ltd., Harrow, altering plant. $42,00.

Ont., Toronto — FACTORY — Preferred Tool & Mfg. Co., Ltd., c/o E. T. Duggan, 1 Queen St. E., factory. $40,000.

Ont., Toronto—GARAGE—Toronto Transportation Comn., W. C. McBrien, 35 Yonge St., P. D. 1, soon lets contract, exten. garage 795 Davenport Rd. $40,000.

Ont., Toronto—PLANT—Jenny Lind Candy Shops Ltd., 301 Lansdowne Ave., plans by J. A. Hatcher, 37 Cowan Ave., plant addn. $40,000.

Ont., Toronto—PLANT—Regal Stationery Co., Ltd., c/o W. S. McCartney, 140 Mona Dr., plant. $40,000.

Ont., Toronto—PLANT—Twin River Oil & Gas, Ltd., c/o T. M. Mungovan, 80 W. Richmond St., plant. $50,000.

Ont., Toronto—PLANT—Vulcan Metalcraft Ltd., c/o N. B. McPherson, 171 Yonge St., rubber and rubber products mfg. plant $150,000.

Ont., Toronto — WAREHOUSE — Ontario Lumber & Wrecking Co., Ltd., 1345 Dufferin St., plans by C. W. Smith, 602 Jane St., 80x110 ft., brick, steel warehouse, 18 ft. high, concrete fdn. $45,000.

Que., Montreal—FACTORY—S. N. Tabah, 372 W. Ste. Catherine St., 2 story, bemat. dress goods mfg. factory. $50,000.

Que., Mount Royal (Postal Dist. Montreal)—PLANT—Canada Dry Ginger Ale, Ltd., 285 Bernard Ave. W., plans by Luke & Little, 1202 St. Catherine St. W., Montreal, re-building bottling plant, Mansur Ave., destroyed by fire. $175,000.

Que., St. Hyacinthe—FACTORY—O Jacques Ltd., 7 St. Michel St., factory. $50,000.

BIDS ASKED

Bids Asked August 1

Conn., New London—DAIRY—New London & Mohegan Dairies, Inc., 73 Jefferson Ave., 1 story, 75x90 ft., brick, concrete dairy addn. $55,000. Payne & Keefe, 27 State St., archts.

Va., Roanoke—FREIGHT TERMINAL—Associated Transport, Inc., c/o Albert J. Carson, archt., 325 Memorial Ave., West Spring field, brick, steel freight terminal. Over $40,000. CD 6/21—ENR 6/29.

Bids Asked August 10

Ill., Paris—FOOD LOCKER—Edgar County Locker Service Co-operative, Paris, 1 story, 70x110 ft. food locker bldg., slaughter house, etc., brick, concrete, $50,000. Tentative data. Hugo K. Graf, 2825 Olive St., St. Louis, 3, Mo., archt.

Bids Asked

O., Cleveland—REFINERY—Standard Oil Co., H. West, engr. in charge, Midland Bldg., refinery addns., incl. excav., cribbing work, pump house, pumps and steel storage tanks. $100,000.

Pa., Pittsburgh — GARAGE — Motor Express, Inc., K. P. Stough, in charge, 1414 Metropolitan St. N.W., rebuilding 1 story, 50x140 ft., steel commercial garage.

Tex., Houston—PLANT—Southwest Wheel, Inc., 1432 Travis St., 1 story, 150x150 ft., plant addn. Over $40,000. L. Q. Cato, 2111 Gray St., archt. F. J. Niven, 2306 Crawford St., engr.

CONTRACTS AWARDED

Calif., San Francisco—PLANT—China Aircraft Corp., 615 Commercial St., plant, 19 and De Harrow Sts., to Empire Constr. Co., 244 Harriet St., $105,000. M. D. Perkins, 110 Sutter St., archt.

Mass., Cambridge—MACHINE SHOP—Warren Bros. Roads Co., 38 Memorial Dr., 1 story, 60x95 ft., brick, concrete machine shop, Potter St., to Turner Constr. Co., 35 Newbury St., Boston. Est. $40,000.

Mass., New Bedford—MACHINE SHOP—Revere Copper & Brass, Inc., 24 North Front St., converting Grinnell Mill into machine shop, to Sullivan-Foster, Inc., 41 William St. Est. $40,000. Johnck-Ehmann, 104 Michigan Ave., Chicago, Ill., engrs.

Mich., Lansing—FACTORY—Motor Wheel Corp., 735 E. Saginaw St., brick, steel, concrete factory, to Reniger Constr. Co., 127 N. Cedar St. Est. $375,000.

Minn., St. Paul — FACTORY — Western Electric Co., 333 Sibley St., altering leased factory, to A. L. Jackson Co., 161 E. Erie St., Chicago, Ill. Est. $300,000. CD 5/24—ENR 6/1.

N. J., Bayonne — PLANT — Ershler & Krukin, Inc., 180 W. 52 St., 52x100 ft. mfg. and shipping bldg. addn., loading platform, etc., to L. Palmisano Co., 671 Ave. E., $15,000.

INDUSTRIAL BLDGS. (Contracts Awarded, Cont'd.)

N. J., Carlstadt—SHOP—Randolph Finishing Products Co., Carlstadt, 1 story, 60x... ft., brick, concrete, woodworking shop, The Forbes Constr. Co., 16 Johnson Ave., ...kensack, $40,000. Carl G. Mettberg, 79 ...ades Blvd., Palisades Park, archt.

N. J., Clifton — PLANT — Bright Star ...rehouse Co., 415 Crooks Ave., 1 and 2 ...y, brick, steel mfg. bldg., to John W. ...rson Co., 152 Market St., Paterson, ...,000.

N. J., Newark—WAREHOUSE—U. S. Steel ...ply Co., 208 S. La Salle Ave., Chicago, ... steel fabrication and warehouse bldg., ... American Bridge Co., Ambridge St., ...tsburgh, Pa. $277,000.

N. J., Passaic — FACTORY — Raybestos-...nhattan, Inc., Willet St., brick, steel ...tory addn., to Samworth-Hughes Co., ... Van Houten St., Paterson. $45,000.

N. J., Piscataway (P. O. Bound Brook)—...LANT—Bakelite Corp., 30 E. 42 St., New ...rk, N. Y., altering vinylite preblending ..., to Wm. L. Blanchard, 45 Poinier St., ...k. $50,000. Francisco & Jacobus, ...ark, ...-5 Ave., New York, N. Y., archts.

O., Barberton—FACTORY—Akron Stand-...d Mold Co. 1634 Englewood Ave., Akron, ...tory, 40x90 ft. and 30x75 ft. brick, steel ...ttern shop and factory addn., to Clem-...r Constr. Co., Inc., 134 E. Thornton St., ...ron. Est. $40,000. Jas. F. Mumser, 540 ... Main St., Akron, engr.

O., Cleveland—FACTORY—Cleveland Twist ...ill Co., D. F. Cox, pres., 1262 E. 49 St., ...tory, 10x15 ft., 43x23 ft. and 30x27 ft. ...tory addn., to Sam W. Emerson Co., 1836 ...clid Ave. Est. $40,000. Geo. S. Rider ..., Terminal Tower, archt.

O., Cleveland—FACTORY—Dickey-Grabler ..., 10303 Madison Ave., 81x156 ft., and ...x18 ft. brick, steel factory addns., to ...rl Flickinger Constr. Co., 5927 Euclid ...e. Est. $45,000. E. J. Holter, 5005 Euclid ..., engr.

O., Cleveland — FACTORY — Thompson ...oducts Co., Sterling Neale, in charge, 2196 ...rkwood Rd., factory alterations for cafe-...ria and locker rooms, to Sam W. Emer-...n Co., 1836 Euclid Ave. Est. $225,000.

O., Mansfield—FACTORY—Mansfield Tire ... Rubber Co., Mansfield, 4 story, 35x60 ft., ...ck, rein.-con. factory addn., to Simon ...ell & Sons Co., 15 Park Ave. Est. $65,000. ...D 7/6—ENR 7/13.

Pa., Aliquippo—PLANT—Jones & Laugh-...n Steel Corp., 3 and Ross Sts., Pitts-...rgh, 104 by-product coke ovens, to Koppers ..., Koppers Bldg., Pittsburgh. Est. $7,500,-...

Tenn., Memphis—PLANT—Southern Acid ... Sulphur Co., Memphis, exten. chemical ...t, to H. K. Ferguson, Hanna Bldg., ...eveland, O., approx. $330,000.

Tex., McAllen—PACKING PLANT—Mc-...llen Citrus Assn., McAllen, 120x130 ft. tile, ...el packing plant, to H. B. Swedlund & ..., Weslaco, approx. $175,000.

Va., Bentonville — PLANT — Stauffer ... Chemical Co., 420 Lexington Ave., New ...rk, N. Y., plant, main bldg. 40x200 ft., ... acre site, to Brown & Matthews, Inc., ...2 E. 42 St., New York, N. Y. Est. ...,000.

Wis., Fond du Lac—FACTORY—Vulcan ...g. Co., 490 N. Main St., steel contract 1 ...ory, 100x100 ft. steel, brick factory, to ...as D. Smith, Hwy. 23 East.

Wis., Mayville—FACTORY—F. Ryzer Co., ...ayville, 3 story, 40x60 ft., rein.-con., brick, ...le factory addns., alterations, concrete fdn., ... Rohde-Kapelle Co., R 3, Mayville, A. ...ussni, 202 N. Water St., Watertown, engr.

Wis., Milwaukee—FACTORY—Interstate ...op Forge Co., 4051 N. 27 St., 1 story, 75x ...0 ft. concrete, steel factory addn., to E. ...eiserwald & Sons, Inc., 5310 W. State St., ...ne 8. Est. $80,000.

Que., Hull—PLANT—Canada Cement Co., ...td. Canada Cement Bldg., Montreal. No. 2 ...ant addn., to E. Brunet & Son, 35 Aylmer ... Est. $50,000. CD 7/13.

UNCLASSIFIED

PROPOSED WORK

Ala., Mobile — GAS PIPELINES — United ...as Pipe Line Co., 1525 Fairfield Ave., ...hreveport, La., several 10 in. gas pipelines ...n bottom Mobile River. Over $40,000.

Colorado—TRANSMISSION LINE—High ...line Rural Electrification Assn., Holyoke, ...ejected bids July 17, 118 mi. transmission ...ne, Colo. 2029D. 1 Phillips, Sect. 2. Will ...robably readvertise. Rocky Mountain Eng. ...o., 1554 California St., Denver, engrs.

Conn., New Haven—COMFORT STATION ...New York, New Haven & Hartford R. R., ... E. Oviatt, ch. engr., Water St., soon lets ...ontract 2 story, 35x110 ft., brick, concrete ...omfort station, Cedar Hill Yards. $45,000.

Ia., Humboldt—SWIMMING POOL—$30,-...00 bond election Aug. 7, swimming pool. ...D 7/6—ENR 7/13.

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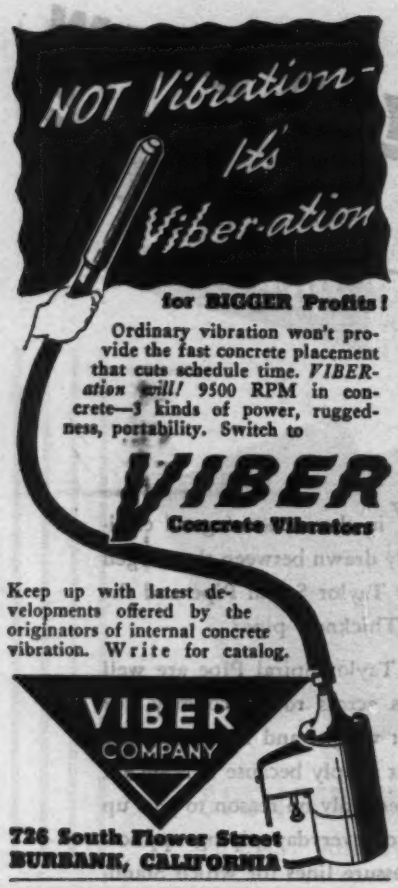

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UNCLASSIFIED (Proposed Work, Cont'd.)

★**Kentucky**—RAILWAY EXTENSION — Norfolk & Western Ry. Co., W. P. Wiltsee, ch. engr., Roanoke, 5.59 mi. exten. to Levisa branch, constructing 2.25 mi. Big Creek Spur. $982,000.

Mass., East Boston (sta. Boston)—AIRPORT BLDG.—State Dpt. P. Wks., Div. Waterways, 100 Nashua St., Boston, plans by C. G. Loring, 7 Water St., Boston, brick terminal bldg. addn., airport.

Mo., Joplin — AIRPORT — City, J. M. Tempies, mayor, City Hall voted $250,000 bonds, airport imprvs., incl. 2 story, 40x160 ft. administration bldg., brick, stone fencing, G. Bates Manning, Joplin National Bank Bldg., archt. CD 5/24—ENR 6/1.

†**Nev., Pyramid Lake**—AIRFIELD—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., plans by Lloyd & Clark, 278 Post St., San Francisco, Calif., airfield for Army Air Force.

N. J., Bayonne—STEEL TANKS—Standard Oil Co. of New Jersey (Eagle Works) E. 22 St., two 35x42 ft., three 25x42 ft., one 30x30 ft. and one 22x40 ft. steel tanks, concrete fdns., own forces, $34,000.

†**N. J., Newark**—HANGAR—U. S. Eng. 120 Wall St., New York, 5, N. Y., hangar for army air base. $36,800.

N. M., Artesia—OIL PIPELINE—Artesia Pipe Line Co., Artesia, 25 mi. 4 in. crude oil pipeline. $80,000.

N. M., Lovington—OIL PIPELINE—Texas-New Mexico Pipe Line Co, Lovington, 4¼ mi. 4 in. crude oil pipeline. $30,000.

N. D., Grafton—AIRPORT—City, W. F. Schutt, aud., City Hall, approved $15,000 bond issue for purchasing airport site. $40,000. Applying for CAA funds.

O., Columbus—CAR SIDING—Pennsylvania R. R. Co., J. L. Gressitt, ch. engr., Broad St. Sta., Phila., Pa., 142 car siding with bridge extens. $349,950.

Oklahoma—TRANSMISSION LINE—Oklahoma Gas & Electric Co., 321 N. Harvey St., Oklahoma City, 33 kv. electric transmission line from the substation at Britton to west Edmond oil field. $35,000.

Oklahoma and Kansas — PIPELINE—Stanolind Pipe Line Co., N.E. 36 and Jordan Sts., Oklahoma City, Okla., soon lets contract laying 16 in. pipe between Drumwight, Okla. and Sycamore, Kan. Over $40,000.

Okla., Shawnee—PIPELINE CARRIER—Oklahoma Natural Gas Co., 401 N. Harvey St., Oklahoma City, laying 7 mi. 6 in. natural gas pipeline carrier. Over $40,000.

Okla., Tecumseh—COMPRESSOR UNITS—Oklahoma Natural Gas Co., 401 N. Harvey St., Oklahoma City, gas compressor units (main line). Over $40,000.

†**Tex., Love Field (br. Dallas)**—AIRFIELD MOTOR REPAIR SHOP—U. S. Eng., 351 W. Main St., Denison, motor repair shop, Sol. No. 41-242-45-2. Over $40,000.

Tex., Quemado—GAS WELL—Texas Gas Utilities Co., Abilene, and Eagle Pass, developing gas well, Chittem area. Over $25,000.

Tex., Taylor—AIRPORT—$60,000 bond election Aug. 12, new airport. CD 7/17—ENR 4/27.

Utah, Salt Lake City—TRACK—Denver & Rio Grande Western R. R. Co., A. E. Perlman, ch. engr., Rio Grande Bldg., Denver, Colo., 20,623 ft. track, trestle, culverts. $107,757.

★†**Canal Zone**—PIPELINE—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., pipeline design and technical services, by Standard Oil Co. of New Jersey, 30 Rockefeller Plaza, New York, N. Y.

B. C., Kootenay—WHARVES—Dominion Govt., Ottawa, Ont., reconstructing wharves at Kootenay and Arrow Lakes. $50,000. Dpt. P. Wks., Ottawa, Ont., engrs.

Quebec—RAILWAY LINE—Canadian National R. R., H. A. Dixon, ch. engr., 360 McGill St., Montreal, railway line from Sennesterre through Lake Waswanpi to La Sarre.

BIDS ASKED

Bids Asked After July 25

Tex., Ozona—OIL PIPELINE—Texas New Mexico Pipe Line Co., Ozona, 16 mi. 6 in. welded joint crude oil pipeline. Over $40,000.

Bids Asked August 1

N. Y., Rockaway Beach (sta. Far Rockaway) — DECKING, etc. — Commissioner Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York, Zone 21, new decking and other incidental work, on boardwalk, Beach 63 St. to Beach 121 St., Contr. Q-162-144, Queens Boro.

Bids Asked August 9

Michigan—STONE DIKE—State Hy. Dpt., Lansing, maintenance and repairing stone dike at State Ferry Pier in Mackinaw City, strengthening cluster fender piling at State Ferry Pier 2 in St. Ignace, Mackinaw and Cheboygan Counties. Plans deposit $2.

Bids Asked August 10

N. Y., New York—SHED—At office Executive Director Port of New York Authority, 111 8 Ave., Zone 11, shed for bagging equip.. Contr. GT-8. F. C. Ferguson, chn. Plan deposit $5, adv. ENR 7/27.

Bids Asked

Mo., Jefferson City — AIRPORT — Cir... H. W. Ellis, clk., municipal airport, 237 acr... site of Missouri River Bottom land in Ca... way Co. $185,000 bonds voted. CD 6/21—ENR 6/29.

LOW BIDDERS

†**Md., Aberdeen Proving Ground**—AUT... TEST COURSES, etc.—U. S. Eng., Standard Oil Bldg., Baltimore, July 15, auto te... courses and bldg. repairs, from D. Pirac... & Co., 2552 Woodbrook Ave., Baltimor... $112,683. CD 7/11.

CONTRACTS AWARDED

†**Calif., Mare Island** — RAILROAD IM... PROVEMENTS—Yards & Docks, Navy Dpt... 18 St. and Constitution Ave. N.W., Wash. 25... D. C., imprv. railroad access., Navy Yard... NOY 9843, to Eaton & Smith, Co., 715 Ocea... Ave., San Francisco, $32,293.

†**Del., Dover**—GUNNERY RANGE—U. S... Eng., Penn Mutual Bldg., 6 and Walnut Sts... Phila., Pa., gunnery range for Army Air Force development program, Dover Army Airfield, Neg. 344, to R. B. Jaggert Eas... Co., Westmont, N. J., $90,280. Bids 6/15 awarded 7/20.

†**Fla., Avon Park** — BOMBING RANGE CONSTRUCTION—U. S. Eng., 575 Riverside Ave., Zone 2, Jacksonville, addnl. construction at bombing range, Contr. W-08-123-eng-437, Inv. Neg. Jax-44-513, to Stevens & Sipple, 1920 N. Orange Ave., Orlando, $99,977. Awarded 6/30.

†**Fla., Avon Park and Tampa**—BOMBING RANGES—U. S. Eng., 575 Riverside Ave., Zone 2, Jacksonville, poorman ranges at Avon Park Bombing Range, Avon Park Drew and McDill Fields, Tampa, Contr. W-08-123 Eng. 440, Inv. Jax. 44-504, to Stevens & Sipple, 1920 N. Orange Ave., Orlando, $95,507. Awarded 6/30.

†**Fla., Fort Myers**—POORMAN RANGES, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Poorman Ranges at Buckingham Army Airfield, Inv. Neg.-Jax-44-514, Contr. W-08-123-Eng. 439 to Moody Bros., Fort Myers, $164,300. Awarded 6/30.

★†**Fla., Jacksonville** — AIR STATION BLDGS.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., 3 storage bldgs., at Naval Air Station, NOY 9409, to Batson-Cook Co., West Point, Ga., $1,116,811. CD 7/12, under LB.

†**Fla., Orlando** — DEMONSTRATION FACILITIES—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, demonstration facilities for technical inspectors' course, Army Airfield, Contr. W-08-123-Eng. 436, Inv. Neg. Jax.-44-516, to Brinson Constr. Co., Tampa, $81,477. Awarded 6/29.

†**Fla., Orlando**—RUNWAYS, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, marking runways, taxiways, Army Airfield, Contr. W-08-123-Eng-360, to H. E. Harkness, 1121 San Marco Blvd., Jacksonville, $24,868.

†**Fla., Perry** — DEMOLITION BOMBING RANGE, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, demolition bombing range, strafing range and skip bombing range, Army Airfield, Contr. W-08-123-Eng-410, Inv. Neg. Jax.-44-517, to J. F. Thomson, Pine Harbor, Townsend, Ga., $58,838. Awarded 6/28.

†**Fla., Tampa**—PARKING APRONS, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, addnl. parking aprons and training facilities for landing following parachute escape, Inv. Neg. Jax-44-512, Contr. W-08-123, Eng. 407, to Brinson Constr. Co., 215 Madison St., Zone 2, $203,030. Awarded 6/24.

†**Fla., Vero Beach**—RUNWAY IMPRVS.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., imprv. runways, Naval Air Station, NOY 9810, to Warren Bros. Roads Co., 1st Natl. Bldg., Birmingham, Ala., $435,555.

†**Ga., Robins Field (br. Macon)**—GRADING, etc.—U. S. Eng., Post Office Bldg., Savannah, grading, paving, miscellaneous drives and walks, ROB 19-44, to H. Newton, Decatur, $30,710. Bids 6/22.

Mass., Deerfield — ATHLETIC FIELD—Deerfield Academy, Deerfield, athletic field, incl. baseball, football, tennis and track facilities, to Kelleher Corp., 35 Walnut St., Turners Falls, $73,900. CD 6/13—ENR 6/15.

†**Mich., Bay City** — LIGHTING EQUIPMENT, etc.—U. S. Eng., 700 Union Guardian Bldg., Detroit, 31, installing lighting equip. and furnishing miscellaneous wiring at Tri-City Airport, near here, to W. D. Gale Inc., 7145 Tireman St., Detroit, $28,500.

†**N. J., Jersey City**—SPRINKLER SYSTEM—U. S. Eng., 120 Wall St., New York 5, N. Y., sprinkler sys., for military bldgs. to J. E. Joyce, 304 S. 12 St., Newark, $32,944.

†**O., Cleveland**—WIND TUNNEL OUTER LINING — National Advisory Aeronautics Comn., F. Hobson, project mgr., Airport, Cleveland, installing steel plate wind tunnel outer lining and insulation constr., to Great Lakes Welding & Boiler Co., E. 29 St. and Hamilton Ave. Est. $42,500.

★†**O., Mansfield**—AIRPORT GRADING, etc.—Civil Aeronautics Admin., 608 S. Dearborn St., Chicago, Ill., airport grading, to P. Mashuda, 5556 W. Roosevelt Ave., Mil...

NCLASSIFIED (Contracts Awarded, Cont'd)

...kee, Wis., $784,970; paving, to Alleghany ...halt & Paving Co., 411 Blvd. of Allies, ...tsburgh, Pa., $619,408. Bids 6/29, CD ...11—ENR 4/13.

...Texas—OIL PIPELINE—Phillips Petroleum Co., Bartlesville, Okla., 200 mi. 2- to ...-in. crude oil pipeline gathering sys. in ...llerton Zone, Amarillo area, to J. R. ...ewart Constr. Co., c/o owner, approx. ...,000.

...Tex., Andrews—PIPELINE—Standish Pipe ...ne Co., East Reno St., Oklahoma City, ...kla., laying 16 mi. 8 in. pipeline, to J. R. ...ewart Constr. Co., c/o Phillips Petroleum ...., Bartlesville, Okla., approx. $76,000.

...Va., Dahlgren—BOMBING AREA IM...ROVEMENTS—Yards & Docks, Navy Dpt., ...St. and Constitution Ave. N.W., Wash., ...D. C., new bombing area imprvs., N.P.G., ...OY 9651, to Diamond Constr. Co., 2801 ...St. N.E., Wash., 17, D. C., $57,250.

...Va., Langley Field—RUNWAYS, etc.—...U. S. Eng., Fort Norfolk, Norfolk, re...onstructing runways, taxiways and parking ...pron and all appurtenant work, to T. E. ...itter Co., 426 W. York St., Norfolk, $1,941,...—ENR 7/13, under LB.

...Va., Quantico—PLANE PARKING AREA, ...etc.—Yards & Docks, Navy Dpt., 18 St. and ...Constitution Ave. N.W., Wash., 25, D. C., ...ddnl. plane parking area, Marine Corp. ...Air Station, NOY 10071, to Mitchell & ...erkel Co., 1343 New Hampshire Ave. N.W., ...Wash., D. C., $89,855; imprvs., exten. steam ...distributing sys., NOY 9380, Marine Bar...acks, to W. G. Cornell Co., 1003 K St. ...W., Wash., 1, D. C., $112,000.

...Wis., Marinette—GUARD LOCK STRUC...TURE, etc.—Marinette Paper Co., Marinette, ...new guard lock structure, rein.-con. fdns. ...and piers, 5 steel tainter gates, steel frame, ...to C. R. Meyer & Sons Co., 50 State St., ...Oshkosh.

...Wis., Racine—LOADING DOCK—Massey-Harris Co., 615 S. Marquette St., 30x400 ft., ...steel, rein.-con. loading dock, to P. Bond...ard Constr. Co., 1135 Mound Ave.

...British Columbia—RAILWAY—Canadian ...Pacific R. R., J. E. Armstrong, eh. engr., ...Windsor Station, Montreal, Que., 9.5 mi. ...railway branch from Haynes to Osuyuus, to ...P. Mannix Co. and Dutton Bros., Calgary, ...Alta. Est. $500,000. Bids 6/16.

...Ont., Eugenia — DAM — Hydro Electric ...Power Com. of Ontario, 620 University St., ...Toronto, reconstructing dam, own forces, un...der supervision of Fred Coyle, Eugenia, ...$70,000.

Proposal Advertisements see p. 170
Postwar Projects see p. 124

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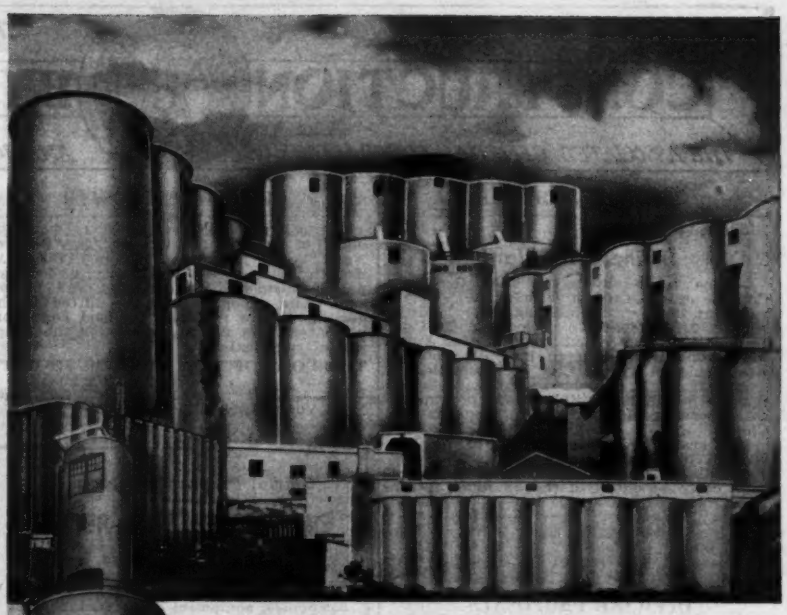

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OFFICIAL PROPOSALS

Bids: August 21 (270)

Incinerator Plant

Notice is hereby given that the City Council of the City of Titusville, Pennsylvania at their stated meeting to be held on August 21, 1944 at 8 o'clock P. M. at City Hall will receive sealed proposals for a 35-ton Incinerator Plant to be built upon a site furnished by the City of Titusville.

A copy of the standard specifications for the said plant may be obtained upon application addressed to George W. Becker, City Clerk.

Incinerator Plant proposals to be addressed to George W. Becker, City Clerk, Titusville, Pennsylvania and accompanied by a certified check in the amount of One Thousand ($1,000.00) Dollars, payable to the City Treasurer, Titusville, Penn'a.

Council reserves the right to reject any or all bids.

George W. Becker,
City Clerk.

OFFICIAL PROPOSALS

Bids: August 10, 1944 (271)

Shed for Bagging Equipment

THE PORT OF NEW YORK AUTHORITY
PORT AUTHORITY GRAIN TERMINAL
CONTRACT GT-8

Sealed proposals for the above work will be received at the office of the Executive Director of The Port of New York Authority, 111 Eighth Avenue, New York 11, N. Y., until 11 o'clock, on the morning of Thursday, August 10, 1944, at which time they will be publicly opened and read in the Auditorium of the Authority at the same address.

Contract documents may be seen at the office of the Chief Engineer, The Port of New York Authority, Room 1538, 111 Eighth Avenue, New York City, and copies will be furnished upon deposit of $5.00 per set. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Frank C. Ferguson,
Chairman

New York, July 27, 1944.

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Official Proposal Division

ENGINEERING NEWS-RECORD

New York City

(D. C. Government)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Washington, D. C., July 13, 1944. Sealed bids (Specifications No. 1077) will be received at the office of the Bureau of Reclamation, Denver, Colorado, until 2 p.m. August 15, 1944, and will at that hour be opened, for furnishing and delivering f.o.b. cars at the shipping point or f.o.b. cars at Odair, Washington, at the option of the bidder, the structural steel for a floating caisson for the maintenance of the spillway bucket at Grand Coulee Dam, Columbia Basin project, Washington. All the material will be installed by the Government. The specifications contain a provision for liquidated damages for delay. On February 29, 1944, the War Production Board issued form WPB-2774, OWU serial No. 3830, assigning rating AA-3, and CMP allotment number U2-4Q44, for the delivery of the articles, materials and supplies to be furnished under these specifications. No charge for copies of the specifications to prospective bona fide bidders; to others $2.00, not returnable. For particulars address the Bureau of Reclamation, Denver, Colorado. (272).

H. W. BASHORE,
Commissioner.

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